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Knowledge Acquisition in Knowledge Transfer Partnerships: an Activity Theory based study of business process improvement using process mapping.

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DECLARATION

I declare that this research thesis is my own unaided work. It is been submitted in partial fulfillment for the requirement for the degree of Doctor of Philosophy at the University of the West of England, Bristol, United Kingdom.

Gareth R.T. White

Date:

“You cannot see what I see because you see what you see.

You cannot know what I know because you know what you know.

What I see and what I know cannot be added to what you see and what you know because they are not of the same kind.

Neither can it replace what you see and what you know, because that would be to replace you yourself."

***Mostly Harmless,* Douglas Adams**

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LIST OF ABBREVIATIONS

AR	Action Research
CBIS	Computer Based Information System
DFA/M	Design for Assembly/Manufacture
EMS	Environmental Management System
EMAS	Eco-Management and Audit Scheme
ERP	Enterprise Resource Planning
KBV	Knowledge Based View
KIB	Knowledge Intensive Business
KIBS	Knowledge Intensive Business Service
KTP	Knowledge Transfer Partnership
LMC	Local Management Committee
MTM2	Method Time and Motion 2
NPD	New Product Development
NPI	New Product Introduction
PAR	Participatory Action Research
PO	Participant Observation
REF	Research Excellence Framework
SECI	Socialisation, Externalisation, Combination, Internalisation
SME	Small to Medium Enterprise
SMT	Senior Management Team
TQM	Total Quality Management
UWE	University of the West of England
ZPD	Zone of Proximal Development

Abstract

Knowledge and its acquisition are seen to be an increasingly important aspect of business management. Universities, through initiatives such as Knowledge Transfer Partnerships (KTP), are influential in the effective co-production and transfer of business management knowledge, however the mechanisms of knowledge acquisition within KTPs have been under researched.

This thesis explores the acquisition of knowledge in three KTPs where process mapping was used in order to deliver business process improvements. It utilises Activity Theory as its research framework, adopting a Participatory Action Research approach with multi-site triangulation and employing cyclic data capture and analysis. Data is captured using semi-structured interviews and instantaneously sampled field notes.

The research identifies the organisational community in which the KTP is conducted to be the most significant source of tensions or disturbances that impinge upon the work that is being undertaken. It makes a contribution to knowledge by classifying a source of tensions or disturbances that are not currently identified by Activity Theory and proffers an extension to the framework to include the 'Tacit Skills' of the individual undertaking an activity.

It also identifies issues of governance, such as the stewardship of public funds that pervade KTPs and threaten to undermine the stated aims of the KTP initiative. Furthermore it highlights the complexities of KTPs and emphasises the need to support the psychological, emotional and training needs of those that are involved in their execution.

1.0 Introduction

This thesis arises from the experience of being a Senior Lecturer at a university in the Southwest of England engaged in the supervision of Knowledge Transfer Partnerships (KTPs) with local organisations.

The author's involvement in the supervision of KTPs stems from a career in organisational management, spanning twenty years and encompassing a diverse range of organisations in different sectors of commerce. Having also previously been an industry supervisor for such partnerships the author was influential in the development and supervision of KTPs for the university.

This thesis explores the notion of knowledge acquisition, in individuals engaged in undertaking programmes of work, resulting from partnerships between university and businesses. It critically examines the partnership arrangements between the university and three local businesses, established through the government-promoted mechanism of Knowledge Transfer Partnerships (KTP). The acquisition of knowledge in a KTP context is conceptualised as occurring through the performance of work. In studying the three partnerships, over an extended period of time, it seeks to uncover those factors that mediate the acquisition of knowledge.

This thesis bridges the gap between literature that explores the political and institutional mechanisms for knowledge transfer and acquisition, and research that explores the conceptual and practical mechanisms of knowledge transfer and acquisition.

It endeavours to provide clear rationale and definition of the key terms and concepts that are used, drawing primarily upon literature from the fields of knowledge management, organisational studies, and operations and quality improvement.

Following the criticisms of the extant literature introduced in the subsequent sections, this thesis aims to further our understanding of knowledge and its acquisition so that it may be more effectively harnessed and utilised by organisations that seek to gain competitive advantage. Fundamentally it seeks to explore the means by which

knowledge may be acquired through partnering with universities using KTPs.

1.1 Knowledge Transfer Partnerships

Schemes such as Knowledge Transfer Accounts (KTAs) exist to provide funding for university-industry knowledge exchange and may be used to fund Knowledge Transfer Partnerships (KTPs) (KTPo, 2012; KTPp, 2012). Knowledge Exchange Opportunities (KEOs) also exist that are outwardly similar to KTPs but focus upon supporting the linkages between social sciences and the commercial world (KTPq, 2012; KTPr, 2012). Further, shorter schemes, such as Strategic Insight Programmes (SIPs) also exist that aim to fund the establishment of links between university and commerce but without undertaking such significant programmes of work or knowledge transfer (KTPs, 2012; KTPt, 2012; KTPu, 2012).

Knowledge Transfer Partnerships (KTPs) facilitate the relationship between university and organisations and are equally applicable for the transfer of technical knowledge and business management knowledge (KTP, 2011). KTPs are "*UK-wide programmes*" that form a partnership between an organisation and "*a university, further education college or research and technology organisation…to help your business develop*" (KTPa, 2012; KTPg, 2012; KTPi, 2012). Organisations may be micro-sized, small to medium sized enterprises (SMEs) or large business, in private, public or third sectors. Sector-specific variants of KTPs also exist including those that focus upon environmental and sustainability issues (KTPh, 2012).

Projects that KTPs aim to deliver include development of new and existing products, development of marketing strategies and the development of business processes and practices (KTPc, 2012). The benefits that KTPs are expected to bring are significant, ranging from the creation of new jobs to the increase in profits: an increase in PBIT of £220,000 has been achieved in some instances (KTPb, 2012). The success of KTPs has been widely reported (KTPk, 2012; KTPn, 2012),

and they have, for example, been used as vehicles for improving the service provided to alcoholic hospital patients (KTPj, 2012), achieving ISO9000 certification (KTPl, 2012) and the design of high-technology products (KTPm, 2012).

In brief, KTPs are part funded ventures whereby an Associate is employed to undertake a significant project for an organisation, supported by experts and academics from university. Being part-funded by the Technology Strategy Board or similar funding body, typically up to 65% of the total cost, some of the commercial pressures that have been shown to be influential and deleterious to knowledge intensive businesses (KIBs) co-production (Cyert and Goodman, 1997) can be seen to be significantly reduced by the adoption of KTPs as a mechanism for organisational development.

Over three thousand organisations have embarked upon KTPs since their launch in 2007 (KTPc, 2012). KTPs are more than simply mechanisms for organisations to receive funding to undertake work, rather they are intended to be mechanisms for transferring knowledge and enable knowledge to be "*embedded into the business*" (KTPa, 2012).

Figure 1.0 depicts the typical interactions between the various actors that are involved in KTPs, and are discussed in detail later. The frequency of interactions varies greatly between actors. The interactions between the KTP Associate and the Industrial Supervisor, and indeed the whole organisation, are almost continuous; the Associate being physically located within the host organisation. The Associate is also in frequent contact with the Academic Supervisor, this being a stipulation of the KTP contract, and often necessitated by the work being undertaken by the Associate; at times there is a need to work closely together, for example, during the early stages of the partnership when the programme of work is being detailed. Contrastingly, the KTP Adviser will only be in direct contact with the other actors during Local Management Committee (LMC) meetings, although ad hoc communications may take place outside this. Similarly, the Academic and Industrial Supervisors may only make direct contact at the monthly management meetings, though in practice they

tend to meet more often than this, for example, attending meetings that are scheduled by the Associate to discuss key developments.

To highlight the relatively high frequency of contact between the Associate and the Academic and Industrial Supervisors, those relationships have been indicated by bold arrows in Figure 1. It can be seen that these relationships are the primary means by which problems, skills gaps and their resolutions are identified and addressed within the KTP Partnership. Beyond these day-to-day relations between individuals, occasions arise, such as during monthly Management Meetings, where the KTP Adviser, the Associate, Academic and Industrial Supervisors will be working together as a small group. Also, recognising that the Associate spends the majority of their time working in the host organisation, they are frequently involved with other individuals that are affected by the KTP's activities but who are not directly involved with the KTP, and these interactions are therefore not indicated in Figure 1.

KTPs can be seen to involve instances where knowledge acquisition appears to occur between individuals, between small groups of individuals and, ultimately, between individuals throughout the organisation. The Associate's role among these relations is of paramount importance and therefore forms the focus of this study's examination of knowledge acquisition in a KTP context. Interestingly, and in accord with the approach taken in this thesis, Bettencourt, Ostrom, Brown and Roundtree (2002) point out that the literature examines the many facets of business-to-business relationships that are significant in determining the success of any form of mutual partnership, but that they "*overlook the role of individual contributions to effective partnerships"* (p106-110).

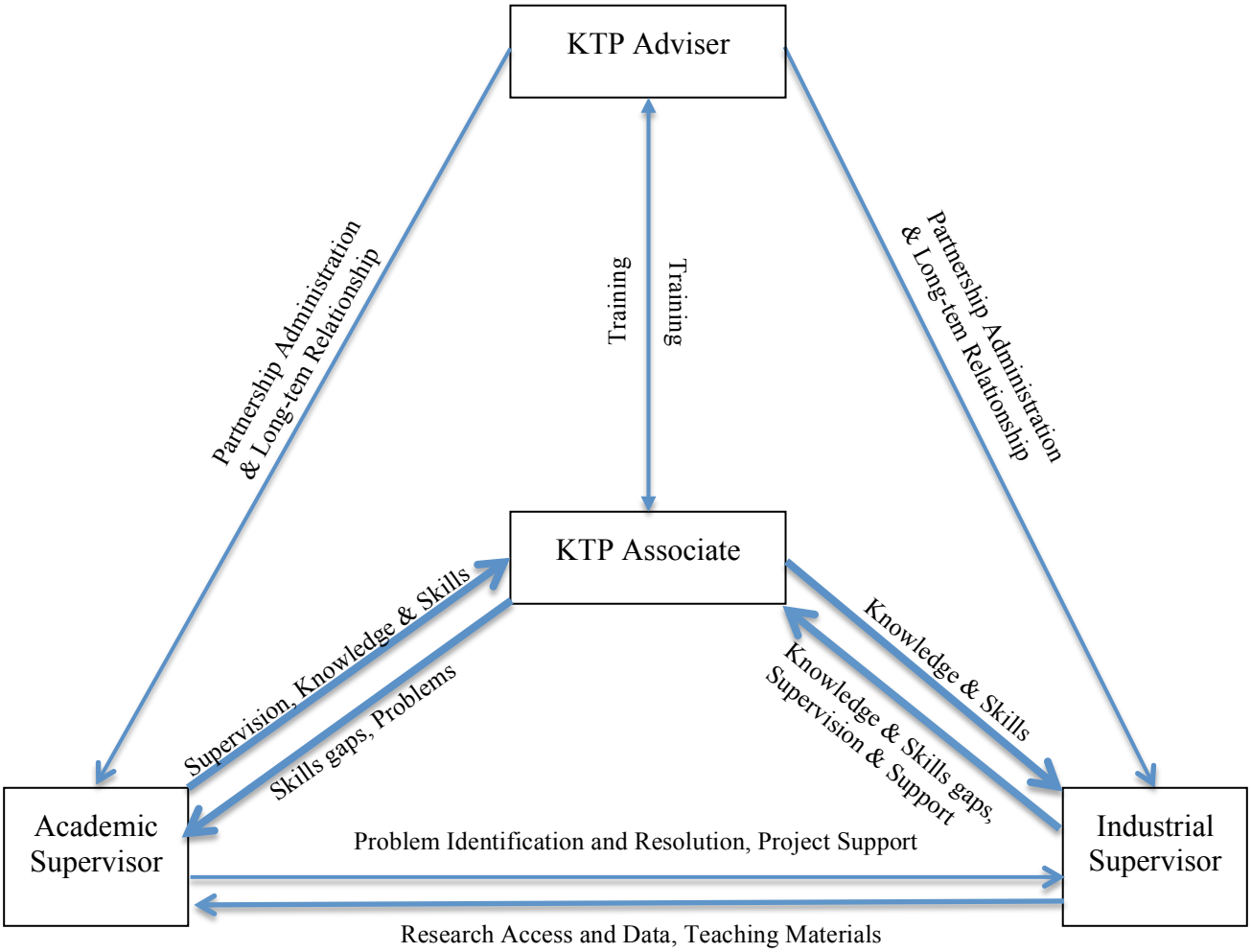

Figure 1.0 – KTP Actors and their interactions

In addition to delivering real benefits for organisations, KTPs are aimed at providing benefit to "*all the partners*" (KTPd, 2012): being of strategic or tactical importance for the business, requiring expertise from the knowledge base partner and be challenging for the Associate that is employed to undertake the work (KTPd, 2012).

KTPs therefore offer an attractive way for universities and enterprises to collaborate. Typically, university graduates are employed as KTP Associates to undertake a substantial piece of work for an organisation under the guidance of an Industrial Supervisor and an Academic Supervisor. Not only does the KTP provide the organisation with a dedicated resource to undertake a significant project but also provides access to a university's corpus of knowledge and experience. The

university gains the opportunity to inject its expertise into the commercial environment and to engage in further research. Additionally, the Associate gains valuable vocational experience and is supported through a programme of further study resulting in nationally recognised qualifications, including the opportunity to study for a higher degree. Being part funded, and not requiring the diversion of existing human resources away from current organisational activities, KTPs potentially have significant advantages over other more traditional consultancy arrangements, particularly for small to medium sized enterprises (SMEs).

A further expected benefit of undertaking KTPs is providing academics opportunities to develop contemporary teaching materials and conduct research that may contribute toward national research evaluations such as the Research Excellence Framework (REF), as well as the chance to apply knowledge and expertise (KTPe, 2012) - for which, half a day per week of the academic's time is allocated, for the duration of the partnership (KTPe, 2012). KTPs have been conducted with over 100 universities and other knowledge base partners, across a variety of disciplines including business management (KTPe, 2012).

Recent graduates, employed as Associates to undertake the partnership work, get the opportunity to use their degree in a real world situation whilst gaining invaluable career experience in managing a significant project (KTPf, 2012). During the KTP, approximately 10% of an Associate's time is spent gaining further qualifications and training

Recognising the complexity of undertaking such a programme of work KTP Advisers are employed to support the development of the KTP proposal and ongoing partnership (KTPe, 2012). Advisers support academics in meeting their objectives, as well as guiding training of Associates and the administration of funds (KTPe, 2012).

1.2 Challenges in the KTP Context

Summarising the intentions and mechanisms of KTPs discussed above:

- Government and funding bodies endeavour to stimulate economic growth and the production and application of knowledge within university and commerce via KTPs.

- The university expects to improve its renown and relationships with local businesses, government and other funding bodies, while cost-effectively managing often complex programmes of work, and capturing and disseminating new insights into organisational theory, technology and practice.

- Partnering organisations expect cost-effective, expert support from university and government to deliver organisational change, and the acquisition of knowledge, in partnerships that may take several years to complete.

- Graduates, employed as KTP Associates to undertake the programmes of work, expect the opportunity to apply and expand their business skills and knowledge under expert supervision, while gaining higher qualifications.

At the centre of these activities and expectations: the Academic Supervisor designs and manages the programmes of work to address business issues, securing funding, recruiting, training and providing pastoral support to Associates, and undertaking and disseminating original research; the Industrial Supervisor co-develops the programmes of work to address business issues, while guiding and supporting the Associate, and attending to operational duties at the host organisation; the Associate occupies a pivotal role, using their graduate knowledge, drawing upon the Academic and Industrial Supervisors' expertise to carry out a programme of work, delivering and embedding improved practices and performance in the host organisation (see Figure 1.0).

One of the recurrent issues encountered while supervising KTPs was the difficulty faced by the Associates that were employed to perform the work. They were frequently frustrated, stressed and angry at the impediments they faced in attempting to achieve the goals of the project. Often, these impediments were apparently due to their comparative lack of experience

of working in complex organisations, or due to their lack of experience of business improvement tools and techniques. Most surprisingly perhaps, these impediments were frequently due to the organisation's perceived reluctance to support the attainment of the KTP goals.

The result of this was not just a difficulty in completing the project objectives, but also sometimes a reluctance of the KTP Associate to remain in the employ of the partnering organisation after the KTP has ended. This is one of the desired outcomes of KTPs and is one of the mechanisms by which knowledge is said to be embedded in the organisation. Consequently, these tensions conspire to lessen the efficacy of the partnership as a mechanism for knowledge transfer.

Further concerns also arose over the way in which KTPs had been advertised to university staff. The aims and benefits of KTPs have been outlined in the previous section and, as can be seen, these are significant programmes of work for both the university and the partnering organisations. However, Appendix E contains an internal university memo that promotes KTPs to academics: the names of individuals and of the institution have been removed to maintain anonymity. While it identifies the potential to develop teaching and research outputs from these partnerships, it also highlights their attractiveness in terms of "*getting out of the university…for half a day a week*" and "*workload bundles!*" – academics having to complete a given number of 'workload bundles' per year to fulfil their contracts. In the Researcher's view, this trivialising of the benefits of KTPs does not serve to reinforce the importance of these partnerships, not just to the partnering organisations, but also to the development of the United Kingdom's economy. Furthermore, it suggests that even complex partnerships may be managed by academics, ignoring the possibility that staff may have little or no prior management or consultancy experience, and may be in need of extensive training and support to ensure partnership success.

1.3 Knowledge in an Organisational Context

The management of knowledge has been discussed as a necessary core competence for modern organisations that seek to obtain and maintain competitive advantage (Geiger, 2011; Albert, 2005; Peltonen and Lamsa, 2004). Govindarajan and Gupta (2000) state, "*unless an enterprise continuously generates new knowledge, it will soon be playing tomorrow's game with yesterday's tools"* (p72) and Ambrosini and Bowman (2001) observe that "*tacit knowledge*…[has] *been argued to occupy a central place in the development of sustainable competitive advantage*" (p811). Sabherwal and Becerra-Fernandez (2003) conclude that individual-level knowledge creation and transfer is vital for further knowledge creation and highlighted "*organisations that continue to invest in the intellectual growth of their individuals will continue to reap rich returns via growth in organisational knowledge*" (p248).

Knowledge has been studied in a range of contexts from international and multinational business (Eunni, Kasuganti and Kos, 2006; Kogut and Zander, 1993), to projects (Eskerod and Skriver, 2007; DeFillippi, Arthur and Lindsay, 2006; Chan, Cooper and Tzortzopoulos, 2005; Wankel and DeFillippi, 2005), to consultancies (Apostolou and Mentzas, 1998) and individual organisational case studies (Khalil, Claudio and Seliem, 2006; Liebowitz, 2003; Kuan-Tse, 1997). This body of knowledge has been perceived by some to replace lean principles, in particular Total Quality Management (TQM), as the fundamental means by which many organisations can achieve competitive advantage (Ju, Lin, Lu and Kuo, 2006; Adamson, 2005).

Knowledge management has been widely described in a range of studies as the use of Information Technology to aid the collection and dissemination of knowledge (Maier, 2001; Malhorta, 2001, 2000; Tiwana, 2001, 2000; Srikantaiah & Koenig, 2000; Mueller and Dyerson, 1999; O'Leary, 1998; Boland and Tenkasi, 1995), as the general process of acquiring and disseminating knowledge (Alavi & Leidner, 2001), as the complex interaction and knowledge exchange between individuals, groups and organisation (Small & Sage, 2005) and as the transfer of

knowledge between organisations (Bettencourt, Ostrom, Brown and Roundtree, 2002). It has been said that key to the study of knowledge management is the concept of 'knowledge productivity' that is "*the production of knowledge in some distributable form*" (Tillema, 2006, p174).

Some of the literature appears to assume that knowledge transfer and production merely happens, and little consideration is given to the mechanisms by which this actually occurs. A recurring criticism of the extant knowledge transfer literature is the relative lack of appropriate empirical testing and evidence to support theoretical concepts and organisational knowledge-models, a lack of common terminology to express the conceptual building blocks, and a tendency to focus upon the process of knowledge transfer and organisational learning rather than the process of knowledge creation (Schreyogg and Geiger, 2007; Stacey, 2007; Nonaka, von Krogh and Voelpel, 2006; Eunni, Kasuganti and Kos, 2006; Chan, Cooper and Tzortzopoulos, 2005; Leonard and Sensiper, 1998; Nonaka, 1994).

The literature often lacks a clear conceptualisation of the term 'knowledge'. Specific examples include Skjolsvik, Lowendahl, Kvalshaugen and Fosstenlokken, (2007), who discuss knowledge in terms of its creation and its transfer, as organisational knowledge and learning, and also as individual knowledge and learning, in tacit and explicit forms, and its production and transfer through formal and informal networking, without identifying the differences between them. Similarly Bettencourt, Ostrom, Brown and Roundtree (2002) also use the term knowledge without clear theoretical conceptualisation, including discussions of the transfer of codified and tacit knowledge between the client and the knowledge intensive business (KIB), the transfer of knowledge between individuals and the subsequent importance of 'socialisation'.

The term 'knowledge acquisition' is used within this study as it reflects the multi-faceted nature and perspectives of knowledge in an organisational context. The literature discusses many themes including the importance

and benefits for organisations to create new knowledge, for organisations to utilise existing knowledge, the systems and methods that facilitate knowledge use and the importance of the individual and well as the collective. In doing so the terms ‘knowledge management’, ‘knowledge transfer’, knowledge production’ and ‘knowledge creation’, among others, are used, often interchangeably. The term ‘knowledge acquisition’ encompasses these terms and is one that is frequently used within the literature for this purpose (Alondieriene, Pundziene and Krisciunas, 2006; Chen and Edgington, 2005; Ryu, Kim and Chaudhury, 2005; Oyeleran-Oyeyinka, 2004; Patriotta, 2003; Lee and Choi, 2003; Clark and Geppert, 2002; McAdam and McCreedy, 2000; Gupta and Govindarajan, 2000; Ford and Ogilvie, 1996).

1.4 Knowledge Production and Transfer

Much of the literature that examines the nature of inter-organisational transfer and co-production of knowledge tends to focus upon the interaction between commercial organisations. For example between law firms and clients, and between management and engineering consultants and their projects (Skjolsvik, Lowendahl, Kvalshaugen and Fosstenlokken, 2007): the partnerships are found to be governed by overtly commercial pressures.

Skjolsvik et al (2007) find that knowledge-intensive business service (KIBS) firms are more concerned with being able to legitimately claim their possession of knowledge of specific aspects of business and management in order to secure future contracts than with their actual possession of that knowledge: the “…*strategic decisions…often are determined by the availability of clients and assignments*” (p110). They also observe that client selection is important for two reasons, in “*maximising the probability of successful value creation*” and “*enhancing the knowledge-based resources of the firm, thereby making the firm more attractive in client co-production in the future*” (p110). Bettencourt, Ostrom, Brown and Roundtree (2002) also highlight that client selection and eventual partnership is highly dependent upon the potential monetary value of the relationship and does not account for the potential

knowledge-generative value of the relationship, to the extent that one company "*decided that it was spending too much time and valuable employee resources on too many unprofitable customers*" (p114-115).

1.5 The Role of Universities

The role of university in the technological development of industry, through knowledge sharing or transfer, is topical and well researched (D'Este and Patel, 2007; Siegel, Waldman, Atwater and Link, 2003). However, much of this literature perceived of these developments as being initiated or driven by the transfer of technical knowledge, typically via patent or through the establishment of new or joint ventures (Etzkowitz, 1998, 2003; Etzkowitz and Leydesdorff, 2000; Perkmann and Walsh, 2007; D'estre and Patel, 2007; Trim, 2003; Siegel, Waldman, Atwater and Link, 2003). What has also received little attention is the transfer of non-technical knowledge between university and organisations, such as business process improvement knowledge. Furthermore, this literature tends to focus on examining the political or institutional mechanisms by which knowledge transfer can be promoted or conducted, such as the triple helix of relationships between university, industry and government (Abd Razak and Saad, 2007; Etzkowitz, 2003; Etzkowitz and Leydesdorff, 2000).

The dynamics of university-industry relationships have been, however, recognised as needing further research (Perkmann and Walsh, 2007) since it is the "*actual relationships - rather than generic links* – [that] *play a stronger role in generating innovations*" (p260). This is significant since it implies that effective university-industry partnerships are not merely mechanisms for uni- or bi-directional transfer of knowledge: they may in fact be mechanisms for the generation of new knowledge. Cyert and Goodman (1997) for example allude to the potential hindrances to successful partnerships as comprising culture, expectation and environment: that university and industry have significantly different working cultures, especially in terms of time and short-term objectives; that organisations tend to expect measurable deliverables whereas much of the university's expectation is in the form of tacit knowledge that is

"*difficult to identify and articulate*" (p48); and commercial pressures that play upon the organisation that may disrupt or end the relationship with the university.

1.6 Aim of the Thesis

The aim of this research is to understand:

What are the factors that mediate knowledge acquisition in Knowledge Transfer Partnerships that deliver business process improvements?

An extensive review of the literature has identified a single study that used a KTP as the context for research into cultural barriers to change (Losekoot, Leishman and Alexander, 2008). However, the review did not identify any literature that studies the processes of knowledge acquisition that exist within KTPs, nor any examinations of the challenges that KTPs present to the partnering organisations or the individuals involved in their execution. In this respect, this study is believed to be the first that theorises and empirically examines the processes of knowledge acquisition within KTPs that deliver business process improvements.

The research reported in this thesis was conducted within three Knowledge Transfer Partnerships carried out with a university:

The first KTP organisation is a non-profit, rural, agricultural society: hereafter referred to as the 'Rural' organisation. It has been in existence for over 200 years and employs in the region of fifty personnel. The society exists to support agriculture and rural activities in the South West of England and is a nationally and internationally recognised institution.

The KTP with Rural was initiated to develop and implement an environmental management system (EMS). This was required to improve the organisation's waste management systems and practices and thereby deliver bottom-line savings. It was also envisaged that the achievement of an accredited EMS would enable the society to demonstrate and market it's commitment to minimising it's environmental impact and enable it to support other organisations in the area to pursue the development of their EMS in the future.

The second KTP organisation is a nationwide provider of refrigeration, mechanical and electrical services to a range of businesses, predominantly supermarkets and food distributors: hereafter referred to as the ‘Service’ organisation. The organisation was formed in 1988 and employs in the region of 450 employees. The KTP with Service was initiated to explore the organisation’s existing business and information systems, develop a short and long-term strategy, and identify and implement other operational improvements.

The third KTP organisation is a design and manufacturing company providing electro-pneumatic products for a range of military applications: hereafter referred to as the ‘Military’ organisation. It is part of a global group that has been in existence for over 25 years and employs over 4,000 employees. The study was made at a single site that employs in the region of seventy employees. The KTP with Military was initiated to develop and implement a New Product Development (NPD) process to improve the efficiency and effectiveness of new product introduction.

Each of the three KTPs employed Process Mapping as a means of investigating the current state of the business processes and of producing a plan of necessary or desired changes: the theory and practice of Process Mapping is discussed in detail in Chapter 2. In the case of Rural, the process maps enabled the current waste management processes to be analysed for deficiencies in light of both regulatory requirements and the requirements of ISO14001 and Eco-Management and Audit Scheme (EMAS) environmental management certifications and awards. In Service, the process maps enabled the identification of duplication of work and the associated implementation of efficiency savings. In Military, the process maps enabled the current business development processes to be analysed and an improved process to be designed.

Since each of the three KTPs adopted Process Mapping as the approach to achieve the objectives of each partnership, this offered a greater degree of comparability than would have been possible by observing three KTPs that utilised different approaches. Also, by observing three KTPs in organisations that operate in dissimilar sectors of commerce the

relevance of this study's findings to other KTPs is improved: the generalisability and recoverability of this study are discussed in detail in Chapter 4.

The research objectives that guide the development of this thesis are:

(1) Identify and operationalise an appropriate research framework for the study of knowledge acquisition within Knowledge Transfer Partnerships.

(2) Identify the factors that mediate the process of knowledge acquisition in KTPs.

(3) Make recommendations for the improvement of the process of knowledge acquisition that organisations may make through engaging in Knowledge Transfer Partnerships.

1.7 Structure of the Thesis

Chapter 1 has discussed the rationale and motivation for this thesis. It introduced the subject of knowledge acquisition and its study in the context of Knowledge Transfer Partnerships (KTP). The chapter outlined the challenges that KTPs present to the individuals engaged in their undertaking before presenting the aim of the thesis.

Chapter 2 presents a critical review of the literature that is apposite to the study of knowledge acquisition in KTPs. The chapter is structured according to the key themes of KTPs identified in Chapter 1. Firstly, a concept of knowledge-as-doing in individuals is adopted that overcomes the problems of studying tacit-explicit knowledge conversion. Next it examines knowledge acquisition between individuals, groups and the organisation before discussing problem identification and resolution in the KTP context. Finally the chapter explores process mapping as the approach that was taken to deliver business improvement in each of the KTPs studied during the development of this thesis.

Chapter 3 presents the research framework that was adopted for this research. It explores the origins and structure of Activity Theory before discussing its operationalisation for the study of process mapping in a

KTP context. Activity Theory aims to uncover the tensions or disturbances that inhibit the performance of work undertaken by individuals.

Chapter 4 details the research methodology that utilises a Participatory Action Research approach, employing multi-site triangulation and cyclic data capture and analysis. Data was captured through a series of semi-structured interviews and instantaneously sampled field notes within each of the three KTPs. The chapter discusses the measures that were taken to overcome the challenges that were faced during the research. Research ethics are also considered.

Chapters 5, 6 and 7 present the data analysis and discussion for each of the three KTPs studied. The analysis is structured according to the six elements identified within Activity Theory and presents the emergence and development of tensions or disturbances over time. Each chapter finds and presents an emergent element that is not currently reflected within the Activity Theory framework.

Chapter 8 presents the main findings and conclusions of the thesis. It defines the emergent element of Activity Theory as ‘Tacit Skills’ and proffers an extension to the Activity Theory framework as the theoretical contribution of this thesis. The chapter also discusses the issues surrounding the governance of KTPs that were found to be significant to the undertaking of the KTPs in this study. It finishes by outlining the methodological contribution of this thesis and making suggestions for future research.

The appendices provide an account of the cyclic development of interview questions for each of the three KTPs that were studied (Appendix A), along with examples of the instantaneously sampled field notes (Appendix B), an example of the interview transcripts (Appendix C), examples of the process maps that were generated during each KTP (Appendix D), and an internal memo of the university that advertises the benefits of undertaking KTPs to academic staff (Appendix E).

2.0 Theoretical Foundations

This chapter presents a review of the relevant debates around the subject of knowledge acquisition, to explore the principle question that guides this research:

What are the factors that mediate knowledge acquisition in Knowledge Transfer Partnerships that deliver business process improvements?

Section 2.1 develops a concept of knowledge that enables its examination in the context of a KTP. It seeks to address some of the criticisms of the extant knowledge transfer literature, discussed in section 1.3, which fails to clearly conceptualise the term 'knowledge'.

Section 2.2 is structured according to the key features of KTPs identified in section 1.1 and Figure 1.0. It discusses the literature around three themes –

> Section 2.2.1 investigates the interplay between individuals, groups and the organisation, and the factors that mediate the acquisition of knowledge.
>
> Section 2.2.2 explores the issues around problem identification and resolution that mediate the acquisition of knowledge.
>
> Section 2.2.3 studies the aspects of the organisational environment that mediates the acquisition of knowledge.

Section 2.3 discusses the theory and practice of Process Mapping, which is the approach adopted by all three KTPs in this study, to effect business process improvements.

2.1 A Concept of Knowledge in Individuals

The subject of knowledge has been studied and prevaricated upon throughout the history of mankind: Plato for example, in 'The Allegory of the Cave and the Divided Line' draws comparison between that which is 'real' about which we can only have opinion, and that which is 'intelligible' of which we can possess knowledge. Despite 2000 years of discussion and exploration a unanimously acceptable definition of what constitutes knowledge appears elusive. While this may be regarded as an

inconsequential academic dilemma it is in fact of fundamental importance to modern businesses that have come to realise the importance, and value, of knowledge as a resource.

Knowledge is defined in simplistic terms by identifying it as being somehow different to data and information: Kluge, Stein, Licht (2001) state that information is facts and figures whereas knowledge is understanding the significance of that information; Bohn (1994) says that, in a business context, information is "*data that have been organised or given structure…*[and] *tells the current or past status of some part of the production system*" (p61), that knowledge "*allows the making of predictions, causal associations, or prescriptive decisions about what to do*". Tuomi (1999) clarifies the distinction by asserting that externalised knowledge is in fact reduced to mere data and information.

Fernie, Green, Weller and Newcombe (2003) doubt whether a universal definition of knowledge can be found and that even the distinction between data, information and knowledge may not be perfectly clear to all. They do however note the importance of the individual in the acquisition, retention and resultant acting upon knowledge. Sinclair (1951) highlights the individuality of knowledge and the difficulties that this presents when conceptualising terms such as knowledge transfer and sharing, and remarking that "*all opinions…are affected to some extent by the attitudes we hold about the nature of knowledge*" (p13), and that, "*we do not see the lens of our spectacles though we see everything through them*" (p14). Lundberg (2004) even ventures that "*whatever we have in mind is, of course, learned previously; it may or may not accurately reflect reality*" (p8).

A key discussion within the literature centres around whether knowledge resides within the individual or is socially situated. Simon (1991) asserts that organisations are not 'knowing' in the sense that they are thinking or learning, and that all knowledge and learning takes place at the level of the individual: the sum organisational knowledge can be said to be only that which exists in its employees. Stacey (2007) notes how the mainstream knowledge literature focuses upon the harmonisation, or

sharing, of knowledge between individuals but "*does not explain how completely new tacit knowledge comes to arise in individual heads*" (p18). Kim (1993, p41), while conceptualising organisational learning, similarly acknowledges that "*organisations ultimately learn via their individual members*" while Un and Cuervo-Cazzura (2004) identify the strategies by which organisations may create new knowledge, both of which operate by "*promoting interactions between individuals*" (p39). These observations do not necessitate the refutation of the study of knowledge within communities, for "*the rich description that flows from the knowledge practice* [collective, or Community of Practice studies] *approach can yield useful insights*" (Felin and Hesterly, 2007).

Gharajedaghi and Ackoff (1984) also recognise the pivotal role of the individual within discussions of knowledge and posit that "[people] *respond* [to the modern age of accelerating change] *by acquiring more information and knowledge, but not understanding*" (p289). This perspective contrasts with Kluge, Stein and Licht's (2001), mentioned earlier, in suggesting that 'understanding' is something that is above or separate to 'knowledge'. If one accepts Kluge, Stein and Licht's (2001) notion that 'understanding' is the ability to provide explanation, then this may in part explain Gharajedaghi and Ackoff's (1984) assertion that people have not necessarily gained greater 'understanding' despite their increased acquisition of 'knowledge'.

Brown & Duguid (2000) echo the importance of the individual in knowledge acquisition and offer a perspective of knowledge that maintains it must first have a 'knower' and that it is both harder to disseminate and acquire than information. The difficulties encountered in providing explanation to others, or in transferring such knowledge to others, inhibit the process of knowledge acquisition. Keursten and van der Klink (2003) assert that knowledge is "*justified true belief*": *justified*, suggesting that there is some evidence upon which the assertion is based; *true*, that the proposition is verifiable or convincing; *belief*, that the statement is accepted by the recipient. It is important to note however that the onus of responsibility for transferring knowledge does not lie

solely at the feet of the knowledge owner, as Hunter (1999, p315) states, highlighting the importance of the individual and the uniqueness of knowledge to that individual,

> "*We can't reasonably expect those who question the claims either to accept such norms for knowledge, at least in the absence of additional evidence we so far are not in a position to provide, or to engage in a public practice of conforming to and supporting such norms, at least without excessive coercion*".

This suggests that individuals do not necessarily accept other's knowledge, either in written or verbalised or demonstrated form, at least, not without pressure to act in accordance with it from management or other powers. Furthermore, that individuals may be coerced into behaving in a particular manner without having accepted the norms for knowledge.

In summary, the term 'knowledge' appears to be one that defies a singular definition. Knowledge can be considered to be that which resides within individuals, or groups, or entire organisations. For the purpose of this study, which focuses upon the role of a KTP Associate delivering business process improvements, knowledge is conceptualised as that which the individual possesses, and the organisation can be considered to possess the sum of the knowledge of its constituent individuals. The literature however, highlights the difficulties of individual knowledge acquisition, noting that individuals do not simply accept and acquire new knowledge; new knowledge must be perceived as justified true belief before it is assimilated. Alternatively, individuals may be coerced into behaving in particular ways, as if they had accepted new knowledge, if subjected to management pressure.

The next section (2.1.1) discusses the tacit and explicit forms in which knowledge is said to exist: note that other knowledge typologies have been described in the literature but are not relevant to this study, for example, Gourlay (2006), Alavi and Leidner (2001) and Hedlund (1994).

Following this, section (2.1.2) identifies the concept of 'knowledge in action' or 'knowing' that incorporates both tacit and explicit elements. This concept of knowledge eliminates the problems that are encountered

when discriminating between, or reconciling, tacit and explicit knowledge types.

2.1.1 Knowledge Types

The term tacit knowledge introduces a fundamental characteristic of knowledge that has found almost universal acceptance in modern study. Knowledge can be broadly distinguished between that which is explicit, or easily transferred or observed in the form of speech, text, graphs or signals, and that which is tacit, or often difficult to articulate or disseminate, resides within the individual and is highly personal, created or reaffirmed by our unique values, beliefs and experiences. Clark and Geppert (2002) classify these conflicting streams of knowledge management research that on the one hand consider knowledge to be a commodifiable and transferable resource, but on the other hand recognise the complexity of knowledge transfer and its social and situational dependence.

Polanyi (1983) and Cook and Brown (1999) express the difference between explicit and tacit knowledge as the difference between the ability to describe the act of riding a bicycle and the ability to actually ride one. On the one hand, you may be able to describe the activity, of where to sit and which controls to use but you may still be unable to balance a bicycle should you try to ride one. One may have acquired explicit knowledge of the process but have not acquired the ability, skill or tacit knowledge in order to execute it successfully.

Similarly, a competent bicycle rider may describe the process of riding to a non-rider but this will not embed the ability to ride the bicycle in the recipient. The explicit knowledge of the process may be transferred but the tacit knowledge or ability has not. It is the tacit knowledge that is acquired through exposure, experience, practice and experimentation and which cannot be readily transferred between individuals.

This differentiation is subtle but polarises a key discussion within the literature. Cook and Brown (1999) support Polanyi's (1983) view that explicit and tacit knowledge are distinct forms of knowledge that neither

can be converted or transformed into the other, but each is necessary for the acquisition of the other. To return to the bicycle analogy, no amount of explicit knowledge will result in tacit knowledge being embedded in a non-rider. Without experience, that person will never become able to ride a bicycle. However, explicit knowledge of how to operate the controls to steer, brake and propel the machine can enable, and are indeed essential for that person to explore the activity and thus acquire the tacit knowledge or the skills to ride a bicycle. To take the discussion to extremes, it would not be possible to tacitly learn how to ride without first explicitly knowing where to sit. A more difficult proposition to comprehend is that of the competent rider whom has tacit knowledge or riding skills but does not know 'how' they ride a bicycle. By riding the machine though it is possible that they may begin to understand that it is through a series of weaves and steering corrections that they remain upright. To return to Gharajedaghi and Ackoff's (1984) discussion, the rider may have gained the skills to ride but not have the ability to explain how they ride.

Chomsky (1987) warns however that "*how to ride a bicycle…cannot be reduced to systems of abilities and dispositions*" (p11). He notes that knowledge has been conceptualised as both the retention of understanding of how to perform something, such as riding a bicycle, and as the ability to exercise that knowledge of how to ride a bicycle. He concludes that the concept of knowledge as a retained ability is "*misconceived from the start*" (p12) and instead must be recognised as the ability to enact an inner knowledge. This assertion reflects many of the knowledge definitions discussed previously and highlights the importance of an action dimension to knowledge.

Johannessen, Olsen and Olaisen (1999) in proposing a typology for knowledge creation and knowledge integration further suggested the existence of two other types of knowledge in addition to implicit (tacit) and explicit knowledge. These they called *relationship knowledge,* which refers to 'who knows who' or the ability to identify individuals and teams through networks to tap their expertise, and *systemic knowledge,* which is concerned with 'knowing how we know' and could be learned through

studying patterns and interpreting their meaning. Many further classifications and competing and often antagonistic or problematic conceptualisations of knowledge exist within the literature: Alavi and Leidner (2001) identify five perspectives of knowledge; that it is a state of mind, an object, a process, a condition of having access to information, or a capability, Gourlay (2006) outlines a classification of 'knowledge-how' and 'knowledge-that', and Hedlund (1994; and Hedlund and Nonaka, 1993) differentiates between individual, group, organisational and interorganisational knowledge types, while Blackler (1995) notes the multiple images of knowledge portrayed in the literature and differentiates and draws attention to the knowledge types that are embrained, embodied, encultured, embedded and encoded. The literature discussed in this and the previous section clearly identifies the difficulties in conceptualising the terms knowledge and its tacit and explicit forms. The classification of knowledge into other types is deemed to add unnecessary complication to the theoretical foundations of this thesis and is therefore not analysed further: Cook and Brown (1999) adopt a similar perspective that is discussed further in section 2.1.2.

Alavi and Leidner (2001), Hedlund (1994) and Blackler (1995) ascribe to objects the characteristic of 'possessing knowledge'. Hedlund's case of the sale of patents to exemplify the transfer of tacit knowledge is for example, by the definitions in the literature, problematic. He says, "*if knowledge is easily codifiable, selling patents is a feasible strategy*" (1994, p78). All definitions of tacit knowledge in the literature identify that tacit knowledge is not easily articulated or codified and this strongly suggests that Hedlund's assertion cannot be made. Furthermore, Hedlund himself classifies tacit knowledge as "*nonverbalisable*" thereby undermining the assertion that tacit knowledge is codifiable in patents, but also contradicts himself by stating that "*articulated knowledge is specified* [in] *patents*" (p75).

He further complicates his notion of knowledge being transferable within tangible entities when saying "*a patent, or even better, a tangible product is knowledge in a highly articulated form*" (p79). Luck (2007, p38)

concludes that "*design artefacts by themselves were incomplete as embodiments of the collective knowledge*" while Ewenstein and Whyte (2007) stress that artefacts of knowing *facilitate* a dialogue that *can* result in knowledge development, creation and transfer. Osterlund and Carlile (2005) also identify the socially situated nature of knowledge and that sharing such knowledge is much more involved than merely transferring "*abstract bodies of knowledge*" (p 91).

The notion of tacit knowledge being embodied within any tangible entity is incommensurable with many definitions within the literature. One could say that whilst the potter may produce an elegant vase that demonstrates his tacit knowledge and skills, ownership of the vase in no way implies the transfer of them.

In summary, separating tacit and explicit elements of individuals' knowledge is highly problematic. It is difficult to refute the presence of tacit knowledge since individuals are capable of acquiring new knowledge and carrying out new activities, such as riding a bicycle. It is also difficult to refute the presence of some form of knowledge that can be acquired by one individual from another. However, many of the examples of explicit knowledge transfer in the literature can be interpreted as merely information transfer (Tuomi, 1999) and the processes of tacit knowledge transfer are not clear. The following section discusses a concept of 'knowledge in action' or 'knowing' that incorporates both tacit and explicit elements, and overcomes the difficulties encountered when attempting to distinguish between them.

2.1.2 Knowing

The notion of action and experience are ones that appear repeatedly within the knowledge literature. Miller & Morris (1999) assert that knowledge is the synthesis of theory, information and experience, while Leonard and Sensiper (1998, p113) define knowledge as "*information that is relevant, actionable, and based at least partially on experience*". Similarly, Osterlund and Carlile (2005) draw attention to Lave and Wenger's (1991) assertion that "*knowing and learning are constructed by*

relations among people engaged in an activity" (p92). Furthermore, Miller and Morris (1999) and Leonard and Sensiper (1998) assert that knowledge contains an experiential component for its creation. Szulanski (1996) maintains that knowledge dissipates without an opportunity to consolidate that knowledge through practice and experience. Wood (2002) advances this postulate noting the pervading practice of treating knowledge as an objectified and objectifiable commodity and, echoing the importance of action in the generation of knowledge, notes that it is in fact "*the continual becoming of things*" (p.159) through interaction of individual and environment and in a perpetual state of flux. It can then be construed that activity forms a practical basis for the creation, acquisition, retention and output of knowledge. Akbar (2003) too identifies the individual and the role of activity in knowledge generation, asserting that collectivist approaches disregard the relationship between the two.

Furthering the perspective of many researchers, that activity is seen to play a central role in the processes of knowledge production, Mukherjee, Lapre and van Wassenhove (1998, p35) define data as "*measurements and observations that are made with no explicit meaning attached to them*" and use Bohn's (1994, p62) definition of knowledge as "*understanding the effects of the input variables* [of a process] *on the output*". Notably they state that "*unlike data, knowledge is in actionable form, it enhances one's capability to do something differently*". Alavi and Leidner (2001) utilise the definition of knowledge as "*justified belief that increases an entity's capacity for effective action*" (p109) and Keursten and van der Klink (2003, p118) state that knowledge is "…*a justified belief about the truth and the potential to act on this belief*." Nonaka (1994, p16) defines tacit knowledge as "*deeply rooted in action, commitment and involvement in a specific context*" while Avis (2007) confirms the relationship between activity and knowledge creation, noting "*through engagement with activity systems, new knowledge…will emerge*" (p 175). Toulmin (in Engestrom, Miettenen & Punamaki, 2005, p62) even ventures that "*the key notion in any new theory of knowledge needs to be practice*". Similarly, Oyeleran-Oyeyinka (2004) and Alonderience,

Pundziene and Krisciunas (2006), while acknowledging the apparent tacit-explicit nature of knowledge, recognise that the tacit elements are generated via engagement in everyday situations or events: repetition of those actions leading to the development and further improvement of those skills (Sennet, 2008).

Cook and Brown (1999) explore the multi-faceted nature of knowledge that is found within the literature, noting the many different perspectives and definitions that can be compared along dimensions of subjectivity-objectivity and individual-group. In attempting to move away from further classifications of knowledge that contrive to expand the divides along those dimensions they unite them through understanding that work that is performed by individuals involves both knowledge and action. Such 'knowing as action' is said to "*bridge the epistemologies*" (p383) of the polarised dimensions. Knowing therefore does not refer to anything that is consumed by, or necessary for action to take place, but is in fact a fundamental part of that action, it is "*that aspect of action…that does…work*" (Cook and Brown, 1999, p387).

Atherton (2003) also recognises the polarised concepts of knowledge that have been espoused in the literature and the difficulties that are encountered when attempting to adopt a position that accounts for their differences. He offers one such approach to unifying the disparate perspectives of knowledge when stating that they can be melded into the single concept of knowledge-as-knowing. From this position, knowledge is conceptualised as an active component of knowing, being both necessary for action to take place and being generated by that action, reflecting Wagenaar's (2004) assertion that "*knowledge is…simultaneously a condition for and a consequence of acting"* (p651).

Skaret, Bjorkeng and Hydle (2002), in attempting to improve non-financial value-adding management systems, concur with the notion of knowing proffered above and postulate that bridging the gap between incumbent knowledge and value creation may only be achieved by focussing on the activities that are performed. Significantly to this thesis, they also note that Activity Theory has given "*valuable insights in order to understand*

activities as dynamic and iterative processes" (p199) – Activity Theory is discussed further in section 2.2.1.3 and in detail in Chapter 3 as the chosen research framework for this thesis.

Skaret, Bjorkeng and Hydle (2002) illustrate the important conceptual leap that is enabled by the notion of 'knowing' when observing that many organisations focus upon creating layers of knowledge repositories so that they "*know what one knows*" (p193) but comment that "*knowing that you have a spade brings you nowhere, unless you know how to use the spade and have a hole to dig*" (p193). Gherardi (2001), in challenging the literature that explores 'organisational learning' and arguing that the notions of individual, group or organisational knowledge are merely arbitrary, echoes Skaret et al's (2002) viewpoint. She uses the term '*knowing as enactment'* (2001, p132) to illustrate the physical dimension to knowing that utilises knowledge that is in the possessed form such that "*practice connects 'knowing' with 'doing'*" (2001, p136).

Atherton (2003), Skaret, Bjorkeng and Hydle (2002) and Gherardi's (2001) notions of 'knowing' are echoed by Hicks, Nair and Wilderom (2009) who identify that it incorporates both the "*dynamic doing of practice and the using of knowledge*" (p292) and as "*the socially situated activity whereby knowledge is both applied and, thereby, created during practice*" (p292). Knowing is therefore treated as "*synonymous with doing*" (p293). Hicks et al (2009) point out though that knowing is not something that is merely the application and acquisition of knowledge but, as inferred in other's definitions, has an influence upon the knowledge that is already possessed. They term the relationship between knowledge and knowing as 'mutually constitutive' where "*knowing creates knowledge, which in turn guides and influences future knowing*" (p295).

Pfeffer and Sutton (1999) proffer a further valuable observation of the concept of knowing when contesting that not only is 'doing' a way of knowing, but so is explaining and teaching others: and this echoes Kluge, Stein and Licht's (2001) definition discussed in section 2.1. Additionally, they state that experimentation is also a way of knowing. If by engaging in activity then one is able to acquire knowledge, then it follows that by

engaging in a modified activity, an experiment, that different knowledge will be acquired. Experimentation is therefore likely to be capable of generating knowledge that would otherwise not be possible to acquire through the performance of 'normal' or regular activity.

Most importantly Hicks et al (2009) state that "*knowledge is not so much transferred as it is created during knowing*" (p298), knowledge acquisition is therefore not dependent upon the transfer of knowledge but upon "*participation in the activity of knowing*" (p298). This is significant since it suggests that in order for knowledge to be acquired, it is necessary to be involved in the activity that the underlying knowledge brings about. By being involved in the activity, the individual will acquire knowledge of its performance.

In summary, this section has presented the differing concepts and definitions of the term 'knowledge' that are present within the literature. The core debate centres around the tacit-explicit dimension of knowledge that suggests some components or aspects of knowledge are unknowable except to the individual in which it resides. The conversion or externalisation of tacit knowledge is seen by many as the key to enabling the sharing and acquisition of knowledge in order to gain and maintain competitive advantage. The notion of knowledge as an externalisable and transferable commodity, for example in products or patents, is however, not universally accepted.

Adopting the notion of knowing, or, knowledge-as-doing, obviates the difficulties that are presented by attempting to identify or synthesise a universally acceptable definition of knowledge that does not result in epistemological railroading. It further incorporates the action dimension of knowledge whereby individuals demonstrate their inner abilities through the performance of work.

2.2 Knowledge Acquisition in the KTP Context

Chapter 1 discussed the roles of the key actors involved in KTPs and depicted them pictorially in Figure 1. It proffered that knowledge acquisition occurred in the individuals directly involved with the KTP, in

individuals working among small groups, and in individuals throughout the organisation. Central to these occurrences was the KTP Associate and their actions in undertaking the programme of work to complete the KTP. It also identified that the acquisition of knowledge was primarily concerned with the identification and resolution of problems, specifically in this study, the generation of business process improvements. Drawing upon this the remainder of the theoretical foundation of the thesis is structured according to three key themes –

> Section 2.2.1 investigates the interplay between, individuals, groups and the organisation, and the factors that mediate the acquisition of knowledge.
>
> Section 2.2.2 explores the issues around problem identification and resolution that mediate the acquisition of knowledge.
>
> Section 2.2.3 studies the aspects of the organisational environment that mediates the acquisition of knowledge.

2.2.1 Knowledge Acquisition in Individuals, Groups and the Organisation in the KTP Context

Numerous models of knowledge production and transfer exist in the literature, many of which recognise the complex interplay between individuals, groups and the organisation (Nonaka, 1994; Nonaka and Takeushi, 1995; Kim, 1993; Hedlund, 1994; Cavaleri, Sievert and Lee, 2005; Alavi and Leidner, 2001; Blackler, 1995). Other studies (Sabherwal and Becerra-Fernandez, 2003, Szulanksi, 1996; Doak & Assimikopoulos, 2007; Fernie, Green, Weller and Newcombe, 2003) have explored the process of knowledge acquisition in organisational settings and stressed the importance of individuals and interactions between individuals.

Many of the models and empirical studies of knowledge acquisition that are discussed in detail in the following sections highlight the role of socialisation, or interaction between individuals over time, that is important in the shared acquisition of knowledge. The models of knowledge acquisition tend to assume that knowledge production and transfer merely happens, whereas some studies illustrate the factors that

mediate the process of knowledge acquisition, including, individuals' capacity to accept and absorb new information that is dependent upon the credibility of the information, the credibility of the person that is providing the new knowledge and the receiving individual's prior experiences, plus the time over which relationships between individuals are developed.

2.2.1.1 Individual Knowledge Acquisition

Szulanski (1996) explores the difficulties encountered when knowledge is apparently transferred and introduces the notion of 'internal stickiness', employing correlation analysis of 122 best-practice transfers in eight organisations. By considering the conditions or factors that inhibit knowledge transfer the study offers valuable insight into the process of knowledge transfer within organisations. Absorptive capacity, causal ambiguity and source-sender relationship are found to be significant and contrary to the more established views that motivation is the prime enabler of knowledge transfer.

Causal ambiguity is said to arise from the differences in understanding or interpretation of organisational conditions between individuals. Since knowledge of the organisation undoubtedly contains some tacit element, and tacit knowledge is said to be difficult or impossible to enunciate, it follows that this element of the total knowledge of an individual could not easily, if at all, be transferred to another.

Unprovenness of that knowledge is also said to be an inhibitor of its transfer. Since knowledge is said to be built at least partly on experience (Miller & Morris, 1999; Leonard and Sensiper, 1998), the unprovenness of knowledge can be interpreted as a lack of experience that confirms or justifies the belief: as Keursten and van der Klink (2003, p118) state, knowledge is *"…a justified belief about the truth*".

Reliability of knowledge is shown by Szulanksi to be dependant upon the reliability of the source or sender. It could be said that positive experience of that sender, in their prior abilities to impart useful or valuable knowledge and information, would increase the receiver's belief in the

reliability of their knowledge; even without knowledge of the specific knowledge that they were about to impart. Once more the experience of the knowledge recipient can be seen to be a major factor in the knowledge transfer process.

Lack of retentive capacity is suggested to depend upon an individual's ability to "*institutionalise the utilisation of new knowledge*" (p31). Without such ability the new knowledge will be discarded. Whether such ability arises wholly or partially within an individual, through their ability to internalise that new knowledge to form a new and more effective knowledge structure (Walsh, 1995), or, as Szulanski emphasises, arises wholly or partially through the opportunity to practice the application of that new knowledge within the existing organisation's structure, is debatable.

In seeking an appropriate research framework for this thesis Szulanski's (1996) relatively simplistic four-stage model of knowledge transfer, comprising initiation, implementation, ramp-up and integration, is perhaps desirable in terms of its demands upon investigative resource. However, it does not reflect the major concepts and problems associated with knowledge transfer and dissemination in the literature that portray it as a continuous cycle of complex interchanges between multiple individuals and artefacts (Nonaka, 1994; Choo, Linderman and Schroeder, 2007b; Kim, 1993; Hedlund, 1994). Although Szulanski maintains that transfer of knowledge in an organisation is a distinct experience and not a gradual process this does distance the work from the mainstream knowledge research and sites it more closely with the concepts of organisational innovation and radical change. Consequently, Szulanski's observation of the relative importance of motivational factors and individual cognitive factors is of interest, but requires further investigation in a dynamic organisational context where multiple sources of knowledge and multiple projects co-exist.

In summary, the literature points to the problems of individuals' acceptance of new knowledge, as previously discussed in section 2.1. Furthermore, in adopting the notion that the organisation can be

considered to possess the sum of the knowledge of its constituent individuals (discussed in section 2.1), the individuals' difficulty in accepting and acquiring new knowledge, as well as retaining that knowledge over time, therefore becomes a significant factor that mediates the acquisition of knowledge, particularly for an organisation that is attempting to acquire new knowledge through the medium of a KTP.

The next section (2.2.1.2) discusses the factors that mediate knowledge acquisition in individuals that are working in small groups.

2.2.1.2 Group Knowledge Acquisition

Doak & Assimakopoulos' (2007) case study and social network analysis of tacit knowledge exchange among forensic scientists exemplifies some of the problems associated with recent research into knowledge and its transfer; that there is a relative lack of appropriate empirical testing and evidence to support theoretical concepts and organisational knowledge-models, a lack of common terminology to express the conceptual building blocks, and a tendency to focus upon the process of knowledge transfer and organisational learning rather than the process of knowledge creation. They identify tacit exchange as 'advice relations' among forensic scientists; occasions where, usually, more senior scientists provide interpretive or guiding advice to less experienced or established scientists. Data was captured by means of a self-reporting instrument and respondents were requested "*not to record those instances where only functional communication or the mere exchange of information had occurred*" (p.115). Since the differentiation between what constitutes data or information and what constitutes tacit knowledge is unclear, one should question upon what criteria the individual forensic scientists determined whether they had received data/information or knowledge, and whether those criteria were consistent across the survey sample.

Fernie, Green, Weller and Newcombe (2003) focus on the sharing of personal or tacit knowledge and dismiss the notion of knowledge conversion via explicit forms. They highlight the importance of

socialisation of knowledge to facilitate knowledge sharing though deny that knowledge transfer takes place: this alludes to the need for that shared knowledge to be accepted in light of existing tacit knowledge in order for it to become accepted and thus additive knowledge. They argue that strong social ties, signified by trust and time of existence, are ideal for sharing tacit knowledge.

In observing a social interaction between groups of Project Managers around the topic of supply chain management they conclude the individuals' knowledge was "*enhanced in terms of understanding different arguments about supply chain management and its relationship with broader contextual factors*" (p184). They maintain that "*it is necessary to facilitate dialectic debate within a socialised setting*" (p184) in order to share knowledge between individuals. That the individuals in the study gained some further understanding of supply chain issues through debate is not surprising.

Suggesting that debate is necessary for knowledge sharing ignores the notion that much knowledge, particularly tacit knowledge which is the stated focus of this study, is often shared without debate through such means as observation of activity such as that found between master and apprentice. Consequently, this study recognises that social relations change over time, but adds little to our understanding of *how* such relationships mediate the knowledge sharing process. Fernie, Green, Weller and Newcombe's observation that controversy is needed in order to create new knowledge outside of that which is already known or understood reflects Blackler's (1995) assertion that tensions within social systems are likely to propagate new ways of knowing.

Sabherwal and Becerra-Fernandez (2003) explore knowledge from a subjective position, proposing that knowledge is dependent upon human experience. They utilise Nonaka's (1994) description of the phases of the knowledge process (socialisation, externalisation, combination and internalisation) to perform a study of the ontology of perceived knowledge management process effectiveness at the individual, group and organisation levels, employing structural equation modelling of 122

individuals at NASA in the USA. They find that perceived individual-level effectiveness of knowledge transfer processes is affected by both internalisation and externalisation processes; socialisation is important at the group level but not individual or organisational levels, combination is important only at the organisational level.

In summary, the literature highlights the importance of social relations in the acquisition of knowledge, as indicated in section 2.2.1, albeit not in every instance. It also indicates that the length of time that these relations exist is important. Contrary to some perspectives, problems or tensions in the knowledge acquisition process are deemed to be capable of generating new knowledge.

The next section (2.2.1.3) discusses the factors that mediate knowledge acquisition in individuals in organisations.

2.2.1.3 Organisation Knowledge Acquisition

One of the most influential models of knowledge creation and transfer, which has come to dominate the literature, is that of Nonaka (1994) and Nonaka and Takeushi (1995). The SECI model has found considerable favour within the literature but has not been empirically confirmed – though it has been claimed to have been tested (Dyck, Starke, Mischke and Mauwa 2005; Best, Hysong, McGhee, Moore and Pugh 2003). The model (Figure 2.1) expresses the conversion of tacit-to-tacit, tacit-to-explicit, explicit-to-explicit and explicit-to-tacit knowledge as socialisation, externalisation, combination and internalisation (SECI) respectively. These are perceived to occur in a 'spiral of organisational knowledge creation' where the individual, the group and the organisation increasingly convert knowledge types across epistemological and ontological dimensions.

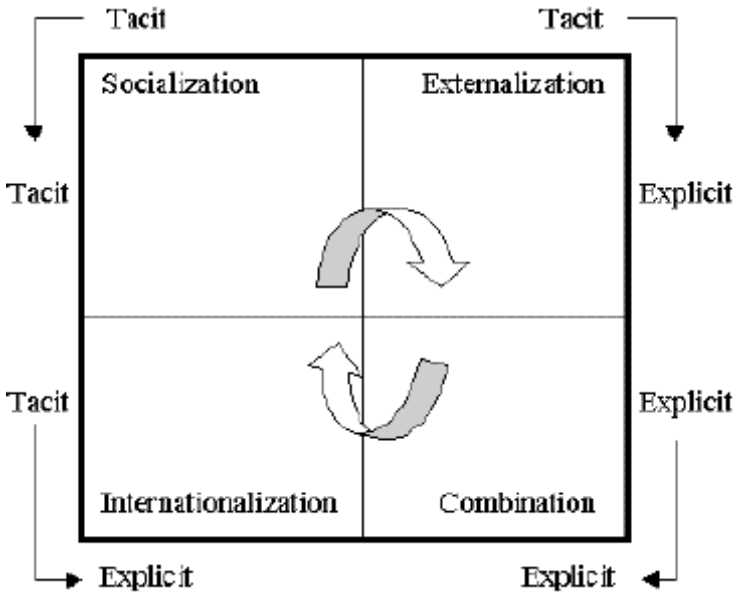

Figure 2.1 – Nonaka's (1994) SECI Model.

The SECI revolves around the notion that socialisation is the primary mechanism of knowledge transfer, Nonaka and Konno (1998) stating that it is "*being together, spending time, living in the same environment – rather than through written or verbal instruction*" (p42). In this respect it appears to mirror the concept of 'knowledge as doing', however, the model does not explain 'how' this takes place. Nor does it indicate any other factors that may exist to enable or inhibit the process from taking place. Akbar (2003) recognises that knowledge transfer requires both the processes of externalisation within the sender and internalisation within the receiver. He argues that the SECI model, for example, over-simplifies the process of knowledge transfer by merely stating that tacit-to-tacit transfer occurs between individuals. The processes of externalising and internalising knowledge is said to be a complex series of psychological processes.

Engestrom (2000a, 2000b) identifies that Nonaka's model, like many others, assumes that the task of 'producing knowledge' is adopted throughout the organisation without problems or challenges and shows that management imposed activity is often rejected, therefore stalling the cycle of knowledge production and transfer at the beginning: this is discussed further in section 2.2.2.1. He also criticises the SECI model for

the data it is based upon that "*all but neglect the small cycles of team-based continuous improvement, or kaizen, commonly seen as the foundation of creative renewal in Japanese companies*" (Engestrom, Miettenen & Punamaki, 2005, p378).

Kim (1993) asserts that organisational learning is dependant upon individuals improving and making explicit their mental models, noting the significance of human reward and motivation that are key determinants of the success of knowledge acquisition. This process is termed 'shared mental models' - sharing such mental models is akin to sharing tacit knowledge. Kim states they *"provide the context in which to view and interpret new material*" (p45) and are like "*the source code of a computer's operating system*" and even "*like the programmer of that source cod*e". As discussed previously, the notion of being able to externalise such a tacit construct is questionable. Kim (1993) in fact states that mental models are difficult to share but proffers that the process requires language or tools to capture them, again highlighting the importance of socialisation and suggesting the significance of individual skills and abilities in the use of tools.

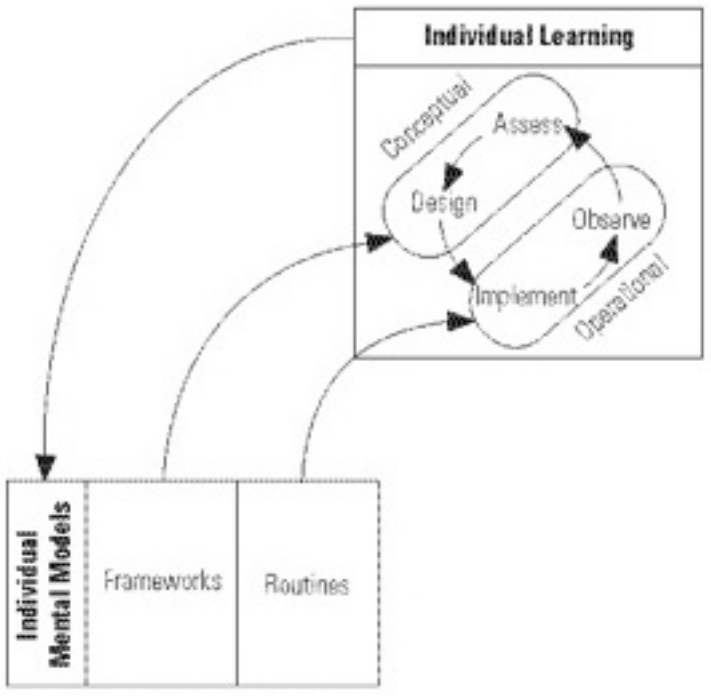

Figure 2.2 – Kim's (1993) model of individual learning.

Hedlund (1994) presents an interesting perspective of knowledge acquisition that is a development of the SECI model. He proffers a model (Figure 2.3) of individual, group and organisational knowledge acquisition, outwardly similar to Nonaka's oft-cited SECI framework (Nonaka, 1994; Nonaka and Takeushi, 1995) and based upon their combined work (Hedlund and Nonaka, 1993). Both of these models attempt to show the ontological spiral of knowledge assimilation and transfer from individual to organisational levels. Hedlund's model makes distinction between the three aspects, or processes, of 'articulation and internalisation', 'extension and appropriation' and 'assimilation and dissemination'.

The model pays considerable attention to distinguishing between individuals, groups, organisations and transorganisational knowledge transferors. However, similar to the SECI model, it appears not to have been empirically confirmed. It also makes short reference to the fact that knowledge and information are different but they are used interchangeably in his study: a criticism levelled at much of the knowledge literature and discussed in section 1.1.

Furthermore, it simply differentiates between the different types of knowledge as either 'tacit' or 'articulated'. It does not acknowledge those factors that may impede or prevent the production or transfer of knowledge. For example, it adopts the position that externalisation of tacit knowledge occurs, despite this being an unclear process that has been challenged by others - for example, Polanyi (1983) and Cook and Brown (1999).

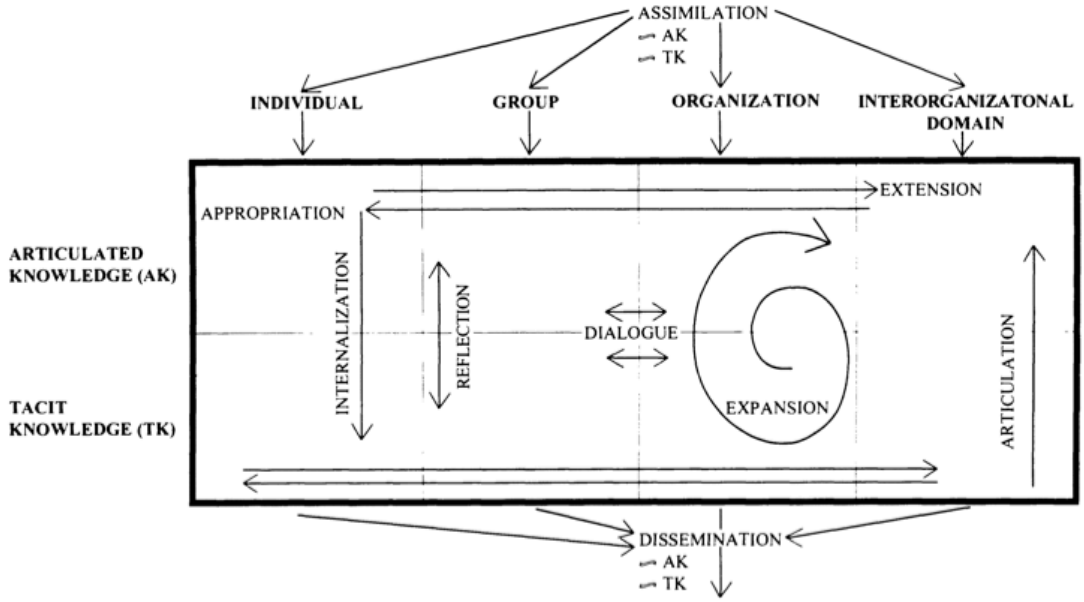

Figure 2.3 – Hedlund's (1994) model of individual, group and organisational learning.

Blackler (1995) recognises the role of activities, identifying knowledge as an 'active process', "*rather than regarding knowledge as something that people have … knowing is regarded is something that they do*" (p1023). He suggests that it is the (social) mechanisms and conditions within which knowledge is created and transferred that should be studied rather than the identity of knowledge itself.

Blackler draws upon Activity Theory (Engestrom, 1987, Figure 2.4) as a means of exploring and understanding the rich tapestry of objects and socialisation that appears to underpin knowledge creation and sharing processes, thereby moving from an understanding of knowledge to an understanding of knowing. Activity Theory draws together the perspective of the individual with that of the community in which they perform and the activities that they perform. Mediating this are the roles of those within the community, the social rules that dictate the communities interactions at large and the language and technologies that the community utilises. Interactions between these factors lead to tensions, paradoxes and breakdowns, which, despite their seemingly insurmountable theoretical problems, are dealt with successfully as part of everyday working life. Activity Theory is seen to offer advantages over contemporary knowledge

theories in as much as it does not consider knowledge as timeless, nor as truth, but as a fluid entity that changes due to the environment and in turn exerts influence for change upon that environment.

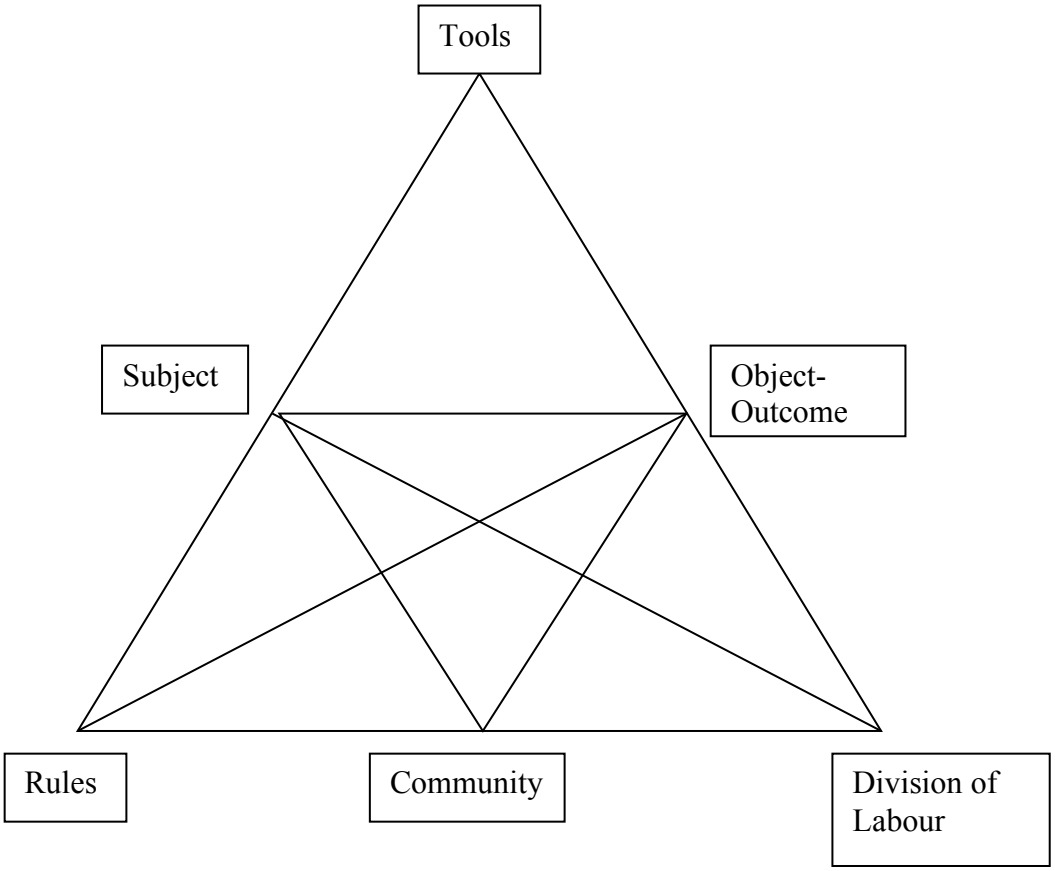

Figure 2.4 Activity Theory

In summary, the models that have been discussed identify the central role of the individual in the acquisition of knowledge at the individual, group and organisational level. This is in accordance with the concept of knowledge adopted in section 2.1. While the models indicate that knowledge acquisition occurs between individuals, they do not clearly identify the mechanisms by which this takes place. Furthermore, they do not acknowledge that the process may be inhibited, or prevented, by many factors, such as those discussed in section 2.2.1.

2.2.2 Problem Identification and Resolution in the KTP Context

2.2.2.1 Management Sanctioned Knowledge

Gourlay (2006) provides a critique of Nonaka's model of knowledge creation and transfer noting that the empirical testing of the 'spiral' sequence still needs to be done. He categorises Nonaka's 'knowledge', or 'justified beliefs' as merely those ideas that are sanctioned by managers, reflecting Hunter's (1999) assertions. In other words they have been filtered by the organisation's managers and are not necessarily the same knowledge as that held by the individual, once more reflecting Hunter's (1999, p315) statement (1999, p315) that,

> "*We can't reasonably expect those who question the claims either to accept such norms for knowledge, at least in the absence of additional evidence we so far are not in a position to provide, or to engage in a public practice of conforming to and supporting such norms, at least without excessive coercion*".

Fiol (1994) provides a two-year linguistic analysis of members of teams in financial services and identifies the paradoxical nature of organisational learning. On one level an increasing diversity of employees is required in order to have a broad range of knowledge resource, but also at another level the organisation requires common understanding in order for those employees to share that knowledge resource. Fiol (1994) proffers the view that contrary to much research, but similar to Fernie et al (2003), it is possible for individuals to "*agree to take action despite differences in the meaning they assign to the action*" (p404) or even that "*action can occur in the face of dissension around one dimension of meaning as long as there is consensus around another*" (p405).

In summary, these perspectives suggest, unsurprisingly, that management can have a significant influence upon the actions taken within an organisation. As well as having direct influence over the actions, it may also have a precursory role in shaping, or filtering, the knowledge that is present within an organisation, and thereby influencing the actions that are taken by others. Furthermore, those persons undertaking the

actions may or may not accept the management-sanctioned knowledge or decisions: they may act under duress, or in ignorance, or even in indifference to management's edicts.

2.2.2.2 Institutionalising Knowledge

Bohn (1994) makes an exploration of production processes in two organisations undergoing technical change and provides an ordinal scale for measuring process knowledge on a scale of 1 to 8. Bohn indicates that at stage 1 the knowledge is 'nowhere' whereas at stage 2 the knowledge is found in a tacit form. Beyond this stage he states that knowledge is to be found in various other forms from written (Stage 3), to written and embodied in hardware (Stage 4), in hardware and operating manual (Stage 5), to empirical equations (Stage 6), scientific formulas and algorithms (Stage7), finally to Stage 8 where no description of the nature of knowledge is given. Although this alludes to an interesting way of describing or classifying the nature of knowledge found in and around a process some critical observation may be made.

Stage 2 implies that tacit knowledge appears from nowhere, and this gradually becomes embodied in written and physical form through Stages 3 to 5. This perspective somewhat mirrors Tuomi's (1999) assertion that knowledge must exist, or be created within a knower before it can be codified and transferred through speech or in writing as information or data. Bohn alludes to the possibility of knowledge being created seemingly from nowhere, presumably either through socialisation with other individuals or by performance of activity, thus, knowledge is created. Yet, similar to others, the nature of this process of socialisation or the factors that govern the processes of socialisation or performance of activity are neither discussed nor identified.

In conclusion Bohn cites Lord Kelvin who considered scientific understanding as the highest form of understanding, that until you can express your understanding of something in terms of numbers than you have but the vaguest beginnings of knowledge. This objectivist view of knowledge is reflected in Bohn's stage model where the goal is to have

knowledge codified in microprocessor control. This is acceptable given that Bohn's paper is centred upon technical knowledge but it fails to capture the gamut of non-technical, knowing that exists in individuals in organisations.

Fu, Lo and Drew (2006) explore the importance of institutional rules and controls, also recognised as an area of profitable future research by Mukherjee et al (1998). They adopt a collectivist perspective, but recognise the primacy of the individual when noting that "*collective learning can simply be considered as the expansion of individual learning in a massive interactive manner*" (p1019). This collective knowledge is then institutionalised into systems, rules and norms.

The extent of individual practitioner's 'learning networks' were measured as the self-reported number of colleagues that they could approach for advice. Although this may be a useful indicative measure of the degree of perceived capacity for socialisation for individual practitioners, it provides no evidence for the nature of the type of engagement between practitioners and colleagues and whether those instantiations would be capable of generating or transferring knowledge.

Drawing upon examples from consultancy practice, prior research and industry reports, Pfeffer and Sutton (1999) evidence the existence of 'knowledge-doing' gaps in organisations. Echoing the pivotal role of activity and action in knowledge processes, they find that although many organisations have invested heavily in training and education, the basic problems that the organisation has faced remain unsolved. The reason for this appears to be one of action and implementation failure rather than a lack of knowledge. In this respect, their observations reflect the assertion within this thesis that knowing, or 'knowledge-as-doing' is more immediately important to organisations than classification and quantification of knowledge. They draw upon existing studies and mention that unsurprisingly knowledge is difficult to transfer *across* firms, but also that knowledge is difficult to transfer *within* firms. They acknowledge that whilst much of a firm's performance must be determined by the knowledge that they possess, "*a much larger source of*

variation in performance stems from the ability to turn knowledge into action" (p87).

Pfeffer & Sutton (1999) discuss how the current trend to focus upon knowledge management, particularly information technology driven management systems, has lead to the conception of knowledge, or know-how, as an explicit entity, and that the acquisition of more knowledge is imperative; that "*once possessed, will be used appropriately and efficiently*" (p89). They draw attention to the fact that knowledge management systems, particularly information technology dependent ones, "*rarely reflect the fact that essential knowledge, including technical knowledge, is often transferred between people by stories, gossip and by watching one another work. This is a process in which social interaction is crucial*" (p90).

They also note that "*knowledge management systems seem to work best when the people who generate the knowledge are also those who store it, explain it to others and coach them as they try to implement the knowledge*" (p91) and this perspective seems to mirror the master-apprentice situation that Polanyi and others also use to demonstrate the process of transference of tacit or implicit knowledge.

In summary, institutionalising knowledge is of paramount importance since it is the way in which organisations benefit from the knowledge of their constituent individuals. Institutionalising knowledge may be achieved through embedding it in physical change to the process, by instilling new forms of action, or by retaining knowledgeable individuals. This study of three KTPs engaged in delivering business process change may be expected to institutionalise knowledge by all three methods: physically changing business processes, imparting new skills and abilities to other individuals (for example, Process Mapping), and by retaining the KTP Associate in the host organisation's employment after completion of the KTP.

The next section (2.2.3) discusses the wider organisational environment in which the KTPs are carried out.

2.2.3 Organisational KTP Environment

Linderman, Schroeder, Zaheer, Liedtke, Choo (2004) and Choo, Lindermann and Schroeder (2004, 2007a, 2007b) use Nonaka's (1994) theory of knowledge creation to theorise an integrated view of knowledge and quality from a Knowledge Based View (KBV) of the firm. They appraise the SECI model and note that each of its four modes of knowledge conversion may not be equally important. They contend that organisational performance is improved through the acquisition of knowledge that occurs via the practice of quality management, and conclude that the principle objectives of quality management and knowledge management are to create more organisational knowledge, so that the firm improves. They state that organisations that utilise quality management practices that support the knowledge creation process will be more effective at deploying quality management.

Linderman, Schroeder, Zaheer, Liedtke, Choo (2004) and Choo, Lindermann and Schroeder (2004, 2007a, 2007b) theorise that a six sigma project can be conceptualised as both 'method' and 'context' elements, and propose how different types and degrees of learning and knowledge can occur in a programme of quality management. They argue that balancing exploitative and explorative approaches creates a new quality advantage; whereas heterogeneity of knowledge aids in defending an existing quality advantage, "*intelligent action requires information and prediction*" (p928).

Within Choo *et al's* (op cit) studies psychological safety is defined as the freedom to explore and experiment without fear of ridicule or reprisal while structured method is the employing of rigid method or approach to work. Structured method is an exploitative mechanism whereas psychological safety is an explorative mechanism – organisations can manage one or both to 'encourage' knowledge creation.

Their study, a structural equation model based upon a survey of 951 six sigma practitioners, finds that psychological safety and structured method are both sources of discreet knowledge creation. The choice of method can modify learning behaviours and therefore affect how the firm creates

knowledge. Psychological safety also influences knowledge creation but does not affect learning behaviours.

In summary, the impact of tools and techniques is found to be indirect but psychological safety has a significant effect, meaning that the environment of application is more important than the method chosen in driving the generation of knowledge. It then follows that if the environment is most important then the process of socialisation is likely to be the most significant process in knowledge generation and transfer; as Nonaka and Konno (1998) state, socialisation is said to be the primary phase from which knowledge creation begins. Also, if socialisation is the key process of knowledge acquisition then the nature of the environment in which socialisation takes place must be important in determining its successfulness.

The next section (2.3), discusses the theory and practice of Process Mapping that was adopted as the mechanism for identifying and undertaking business process improvements in each of the three KTPs.

2.3 Business Process Improvement and Process Mapping

A significant volume of literature explores the way in which business process improvement initiatives, tools and approaches can provide benefit and competitive advantage for modern businesses (McCurry and McIvor, 2001; Ugadawa, 1995; Drucker, 1990; Segerstedt, 1999; Syddell, 2005; Mason-Jones, Naylor and Towill, 2000; Bowen and Youngdahl, 1998; Alavi, 2003; Verstraete, 2004).

Some literature recognises the relationship between organisational improvement activities and knowledge acquisition, including Mukherjee, Lapre and van Wassenhove's (1998) exploration of learning in factories, the analysis of benchmarking as a learning tool (Knuf, 2000), knowledge within a humanistic lean approach (McCurry and McIvor, 2001), the knowledge creating abilities of value management teams (Fong, Hills and Hayles, 2007; Yang and Chen, 2005), the creation of knowledge through process change (Carrillo and Gaimon, 2000) and the process of knowledge creation during product innovation (Corti and Storti, 2000).

There have however been concerns over the psychological and sociological pressures that improvement initiatives may put upon workers and organisations, factors that reflect the findings of Choo et al (2004, 2007a, 2007b), discussed in the previous section, and have been shown to be important influences upon the processes of knowledge acquisition in organisations (Needy, Norman, Bidanda, Ariyawongrat, Tharmmaphornphilas and Colosimo, 2002; McManus, 2003; Gagnon and Michael, 2003; Emiliani, 1998; Millar, 1999; Ezzamel, Willmott and Worthington, 2001; Franchini, Caillaud, Nguyen and Lacoste, 2001).

2.3.1 Process Mapping

Among the variety of techniques that may be employed to facilitate organisational improvement process mapping is widely regarded as being a core approach (Hines and Rich, 1997). Process mapping was adopted as the primary means of undertaking business improvement in all three KTPs that form the focus of this study. Though there are numerous variants of this approach they all attempt to provide a mechanism for gaining detailed understanding of the current-state of the way in which the organisation works (Nash and Poling, 2009; Hines and Rich, 1997; Innovations, 2005). Process mapping is used extensively throughout manufacturing industries but has also been used in laboratories, construction, and is equally useful in service industries (Linton, 2007; Winch and Carr, 2001; Frederick, Kallal and Krook, 2000).

Kesner (2001) notes that process mapping may even form the first steps in the process of developing a knowledge management system. Vollmer and Phillips (2000) concur, venturing that process maps enable the organisation to "*understand where knowledge resides today in an organisation… where knowledge is used, how it is dispersed and who uses it*" (p130) and since knowledge requires context or framing to be of use to conclude that "*when properly mapped, processes provide the context*" (p130).

Process mapping is "*an analytical technique*" (Paradiso and Cruickshank, 2007, p32) that graphically depicts how areas of an organisation work

and is an "*effective tool*" (p32) for documenting the current-state. Furthermore, this is not merely an approach for recording a snapshot of current-state but "*with process mapping, organisations create not only an 'is' map…but also a 'should' map that tells where you want to go*" (HFMA, 2006, p1). Tuggle and Goldfinger (2004) proffer that process mapping is a way of acquiring knowledge about processes and that the knowledge can be extracted from the maps since "*there is much valuable tacit knowledge contained in organisational processes*" (p12). Paradiso and Cruickshank (2007) further highlight the value of process mapping in protecting organisations from "*the risk of losing knowledge capital*" (p32) by encapsulating knowledge about processes that could otherwise be lost if individuals leave the company.

Keller and Jacka (1999) use process maps to "*heighten management's understanding*" (p62) of business processes, by interviewing the individuals that 'own' the processes to gather the necessary data. They recognise the difficulties in generating such maps and resort to using two personnel, one to interview the process owners and one to generate the map: this approach is vital to enable the 'live' generation of maps that they deem is important in producing accurate maps. The process owner's involvement in the activity of developing and completing the process maps are seen as vital for gaining their future buy-in. They point out the value of the process maps to the process and department managers: the maps were highly valued, as discussion documents and as training tools.

In summary, while there are many and varied forms of Process Mapping that may be employed in the pursuit of organisational improvement, all exhibit a fundamental similarity in that they result in the pictorial representation of existing process states and facilitate the production of future or desired state maps. Similarly they require the involvement of both the creator of the process map and the owner of the process, an employee of the organisation.

Each of the three KTPs employed Process Mapping as a means of investigating the current state of the business processes and of producing a plan of necessary or desired changes. In the case of Rural, the process

maps enabled the current waste management processes to be analysed for deficiencies in light of both regulatory requirements and the requirements of ISO14001 and Eco-Management and Audit Scheme (EMAS) environmental management certifications and awards. In Service, the process maps enabled the identification of duplication of work and the associated implementation of efficiency savings. In Military, the process maps enabled the current business development processes to be analysed and an improved process to be designed.

2.4 Summary

This chapter has presented a review of the theoretical foundations of this thesis that explores the principle question:

What are the factors that mediate knowledge acquisition in Knowledge Transfer Partnerships that deliver business process improvements?

It has explored and adopted a concept of knowledge as 'knowing, or 'knowledge-as-doing', that enables its examination in the context of a KTP. Adopting the notion of knowing, or, knowledge-as-doing, obviates the difficulties that are presented by attempting to identify or synthesise a universally acceptable definition of knowledge that does not result in epistemological railroading. It further incorporates the action dimension of knowledge whereby individuals demonstrate their inner abilities through the performance of work.

It further explored the literature along three key themes of 'individual, group and organisational relations', 'KTP problem identification and resolution', and 'the KTP organisational environment', developed from the diagram of interactions between key actors in KTPs shown in Chapter 1.

Both the models and studies of knowledge acquisition highlight the role of socialisation, or interaction between individuals over time, that is important in the shared acquisition of knowledge. The models of knowledge acquisition (Nonaka, 1994; Kim, 1993; Hedlund, 1994; Cavaleri, Seivert and Lee, 2005) have been criticised, however, for a lack of empirical testing, or for assuming that the processes of knowledge acquisition merely happen.

Other literature identifies the many and varied difficulties that are present in organisations that conspire to inhibit the processes of knowledge acquisition. Individuals' mental models and capacities have a limiting effect upon knowledge acquisition (Szulanski, 1996), knowledge acquisition requires motivation and reward (Szulanski, 1996; Kim 1993), disagreement, or structured debate, is actually a constructive aspect of knowledge acquisition (Fernie et al, 2003), while Activity Theory (Engestrom, 1987, Blackler, 1995) explicitly identifies the 'tensions' that exist in social systems and conspire to mediate the process of knowledge acquisition.

The literature that has been reviewed reveals a complex role that management plays in the acquisition of knowledge. Management may serve as a filter to knowledge acquisition, sanctioning the dissemination of knowledge and dictating which knowledge is acted upon, potentially through some form of force or coercion. It is therefore not necessary for all members of an organisation to hold the same justified, true, beliefs in order for action to take place, indeed Fiol (1994), in agreement with Fernie et al (2003), suggests that lack of agreement is even valuable for future knowledge production.

Knowledge that has been acquired is widely acknowledged to reside within an organisation's individual members. However, that knowledge may become institutionalised in the form of rules, regulations and working practices (Bohn, 1994; Fu et al, 2006). Interestingly, failing to take action upon available knowledge is cited as being a primary organisational failure rather than a lack of knowledge in the first place (Pfeffer and Sutton, 1999).

While individuals, their capabilities, and relationships with other individuals and groups are seen to be key determinants of knowledge acquisitions, and the ability of the organisation to institutionalise knowledge into rules and practices are key to long term success, the environment in which those individuals operate also mediates the process of knowledge acquisition. The nature of work that is undertaken by individuals influences the knowledge that is acquired, but the wider

environment is found to have an even greater effect (Choo et al, 2004, 2007a, 2007b).

Activity Theory has been identified as a framework for the study of knowledge in actionable form that focuses upon the individual engaged in performing work. It aims to uncover the tensions that mediate that activity being performed, recognising the influence of other individuals and the wider organisational environment that exert influence. Activity Theory has previously been used to explore the performance of work in organisations (Engestrom 1987; Blackler, 1995) and is recognised as an approach that has proved valuable in understanding activity-based concepts of knowledge acquisition (Skaret, Bjorkeng and Hydle, 2002). Specifically, it seeks to uncover the 'tensions' or 'disturbances' that occur in everyday work systems and inhibit the performance of activities.

Process Mapping is used as the primary means of identifying business process improvements within the three KTPs that comprise the contexts for this thesis. This chapter has identified that Process Mapping exists in many different forms that generate a pictorial representation of existing business process states and enable the development of future, improved, process states. Process Mapping involves the participation of individuals to capture process knowledge.

The following chapter explores Activity Theory and discusses its operationalisation for the study of the factors that mediate the process of knowledge acquisition in KTPs. It also discusses how Process Mapping constitutes the activity being observed in each KTP.

3.0 Research Framework – Activity Theory

This chapter explores Activity Theory as a framework for investigating knowledge acquisition through the performance of process mapping, and for furthering our understanding of those factors that conspire to affect it. In doing so it addresses Research Objective (1).

An overview of the origins, the applications and the critiques of Activity Theory are presented in Section 3.1. It is identified as a framework that can provide valuable insight into dynamic, activity-centered, knowledge-generative processes. The structure of Activity Theory is outlined in Section 3.1.3.

Section 3.2 compares the factors that are found to be influential in the processes of knowledge acquisition, identified in Chapter 2, with the discreet elements that Activity Theory incorporates. From this, Activity Theory is determined to be an appropriate framework through which this study is made. Section 3.2 also states how those elements of Activity Theory are interpreted and defined in this thesis, and how Process Mapping constitutes the activity being observed in each KTP.

3.1 Activity Theory, An Overview

3.1.1 Origins

Engestrom (2000a) emphasises Activity Theory among multidisciplinary researchers as a useful tool for studying and understanding work. Although constructed some time ago upon the works of Vygotsky (1978) and Leont'ev (1978) it has only relatively recently acquired status as a recognised research tool among multidisciplinary researchers. Activity Theory also relates closely to the perspectives portrayed earlier, particularly of Cook and Brown (1999) and Polanyi (1983), that experience is a prominent factor in knowledge generation and learning, "*an outcome of the … processes is not merely attaining the goal, but the formation of an experience of goal achievement*" (Bedny, Seglin and Meister, 2000, p201). Jarzabkowski (2003) also noting that within Activity Theory it is the observable practical activity of individuals that allows us to analyse their interaction with organisational and collective systems.

Engestrom (2000a) remarks upon the problems of many theories of organisational learning, such as Nonaka and Takeuchi's (1995) spiral of knowledge creation. Whilst acknowledging the parallels between organisational learning theory and knowledge theories and citing Nonaka and Takeushi's (1995) framework of knowledge creation and conversion as the method by which organisations learn, he maintains that they fail to explain the processes or actions that they comprise. Contrastingly, Activity Theory expressly identifies the problems when, for example, management impose a learning activity on an individual or group and that task is rejected. Traditional models such as Nonaka and Takeushi's (1995) fail to explain the process by which knowledge creation continues to occur; the model suggests that the spiral of knowledge creation merely stalls. Ponomarenko (2004) states that Activity Theory provides ways of studying humans and their behaviour in ways that are more revealing than those that typically treat man as "*a device for information processing*" (p298). Carillo and Beaudry (2006) note that using Activity Theory has identified combinations of factors and variables that have not been studied previously. Activity Theory is therefore a useful lens for investigating existing lines of enquiry but also for uncovering productive directions for future research.

3.1.2 Application

Activity Theory has been widely used as a framework for academic research. It has been used to study the micro practice of strategy in UK universities (Jarzabkowski, 2003), in developing stronger links between psychology and ergonomics (Zarakovsky, 2004), in the development of ergonomics and the relationship between psychology and systems design (Bedny, Kawowski and Jeng, 2004), in the application of psychology theory to practical situations, particularly in the study of pilot-system ergonomics and design (Ponomarenko, 2004), to explain the dynamics of negotiations in Higher Education Institutes in the UK and US (Benson and Whitworth, 2007) in the "*social collaborative activity*" (p88) of information system development, its role in tailoring the structure of the development method to suit organisational and situational requirements (Karlsson and

Wistrand, 2006), and to review the individual and societal customer-centered e-Commerce literature (Carillo and Beaudry, 2006).

In discussing Engineering Psychology Bedny, Seglin and Meister (2000) describe the assessment of equipment fitness for use and how the relative usefulness of information aided subjects in learning how to operate equipment. This developed from Vygotsky's notion of the Zone of Proximal Development (ZPD) where the gap between unaided problem solving and aided problem-solving indicated a subject's 'learning potential' in terms of actual ability. Since changes in the equipment characteristics prompt changes in the way that subjects operate the equipment it is possible to assess the fitness of the equipment for its intended purpose.

Bedny et al (2000) link mental actions and knowledge with physical action and therefore with equipment design, noting "*knowledge is the representation in our minds of objects or phenomena in the form of images, concepts or propositions. Thinking is what one does with knowledge and the actions a person performs based on that knowledge*" (p181). One can propose that equipment or work design can therefore affect an individual's actions and one's knowledge. Interestingly, Choo, Linderman and Schroeder's (2007b) study of six-sigma application indicates that the working environment has a greater effect upon knowledge creation than the choice of method. While this at first appears to only weakly support Bedny et al's assertions, it must be noted that Choo et al's study is founded upon Nonaka's framework of knowledge creation which separates the notions of socialisation and Internalisation that Bedny et al maintain are mutually dependent: the triangulation of findings from different theoretical positions suggests some degree of validity to the results (Bryman and Bell, 2003).

Ardichvili (2003) also considers the Zone of Proximal Development (ZPD), where two or more individuals combine efforts to solve a problem that neither of them alone could achieve. Thus they are engaged in a ZPD where there is a gap between existing states in the workplace and the future states brought about by solving the shared goal. In working

toward, and solving, the problem, significant cognitive change and development takes place. However, "*joint construction of knowledge is possible only when all those involved are willing to develop an understanding of the others*" (p10) – a statement that echoes Hunter's (1999), made in section 2.2.2.1. Not only does this reinforce the need for shared understanding and shared goals, but also that workplace problem solving and action can lead to knowledge acquisition.

Bedny, Seglin and Meister (2000) note that physical or work activity is "*inextricably linked with internal mental activity*" (p169) and this echoes the theme within the theoretical foundations of this thesis, discussed in Chapter 2, that suggests activity is an integral part of knowledge creation: such as the example of apprentice learning a trade from a master. External activity is said to be internalised, a phrase that mirrors the stage of Internalisation found in Nonaka's knowledge creation framework. However, internalisation is not merely the "*transfer of external processes to the internal plane*" (p171) but is the result of associated social interaction. Bedny et al (2000) point out that the notion of internalisation is often used inaccurately and in a way that reduces it to memorisation. Similarly, they state that internal, mental, activity can be exteriorised through speech or action, a process that bears resemblance to Nonaka's notion of Externalisation.

Activity Theory portrays everyday work and action in light of the longitudinal work structures and goals of the encapsulating organisation or group. The continual forging, relaxing and reforging of relationships between subjects and artefacts is termed 'knotworking' by Engestrom. The knots become the focus of attention during the enquiry rather than the person and the artefacts themselves. Activity systems are cyclic and self-modifying and self-perpetuating since their actions result in further actions: Skaret, Bjorkeng and Hydle (2002), in accord with this thesis, adopt the notion of knowing, and note Activity Theory's ability to provide insight into knowledge-generative activities that are dynamic and continuous processes. This highlights the pertinence of Activity Theory to the study of knowledge generation as many of the definitions of

knowledge identified in the literature emphasise that knowledge is created through action and also the value of knowledge in generating further action (Leonard and Sensiper, 1998; Keursten and van der Klink, 2003; Alavi and Leidner, 2001; Fernie, Green, Weller and Newcombe, 2003).

Significantly, Bedny, Karwowski and Bedny (2001), in exploring the concept of self-regulation whereby feedback and feedforward systems regulate Activities, state that "*learning is the process of constant transformation of the structure of activity*" (p408) and even that "*action is the basic unit of learning activity*" (p414). Thus, the processes of mental cognition and work behaviour can be interpreted as the processes of human knowledge acquisition; as Bedny and Karwowski (2004) state "*through activity a person…*[obtains] *knowledge*" 151). Jarzabkowski (2003) notes that Activity Theory is "*essentially a learning theory*" (p27). Benson and Whitworth (2007) recognise the connection between learning and activity, noting that it is the inherent tensions and contradictions within a system that encourages learning and are "*essential to its creative, transformatory potential*" (p79). In accordance with Engestrom they state that it is the tensions or 'disturbances' encountered in everyday work systems that Activity Theory aims to identify and explain.

Engestrom (2000b), in agreement with Blackler (1995), highlights the role of Activity Theory in understanding the social construction of knowledge. In particular, its strengths lie in unravelling processes such as expansive learning that occur over relatively long periods of time. As also identified by Blackler (1995), in studies of work activities it is the identification of stresses or contradictions, termed 'disturbances' that are sought. It is these disturbances that result in perpetual instability of the system thus forcing the various components of that system to readjust their relationship to one another. These disturbances are the focus of attention for redesign of the working system in order that they are reduced or eliminated. Kain and Wardle (2005) note the value of Activity Theory in identifying conflict and contradiction in work based systems that "*interfere with the realisation of individuals' and communities' goals*" (p122).

Bedny, Seglin and Meister (2000) state that Activity Theory discovers the complexity of conscious and unconscious processes that occur during work by the observation of conscious activities. Core to this approach is understanding the importance and role of human tools that produce individual consciousness and culture. These tools are non-verbal and include gestures or mathematical symbols. Bedny, Kawowski and Jeng (2004) also identify the conscious and unconscious elements of work as noted by Bedny et al (2000) when noting that the process of reflection in Activity Theory is "*a complex, multi-faceted problem*" (p276) comprising conscious (verbal and symbolic) components and unconscious (cognitive) components.

The importance of verbalisation, as mentioned by Bedny, Karwowski and Bedny (2001) for example, in the enactment of activity and the process of knowledge creation and learning through that activity, is restated by Thompson (2004). His proposed modification of traditional Activity Theory contains the central notion "utterance". Although the nature of verbalisation has received much attention and use in the study of social systems there are significant critics of it. Bakhtin (2006a) observes that genres of speech are innumerable simply because "*the various possibilities of human activity are inexhaustible*" (p60). That the patterns of speech grow as the particular sphere of activity grows: "*it might seem that speech genres are so heterogenous that they do not have and cannot have a single common level at which they can be studied*" (p61). He refers to the spoken word as 'heteroglossic', at once requiring formal structure and syntax to be comprehensible but also rich with meaning, dependant upon the context in which the word is spoken (2006b).

The link between cognition and behaviour is central to Activity Theory and neither can take place in isolation, to the extent that human mental development is said to be governed largely by social experience and work (Bedny, Karwowski and Bedny, 2001). Without prior experience, mental actions cannot readily take place and require external motor and verbal actions. A learner will initially use written instructions to manipulate external objects and signs. Once this phase of learning has occurred then

the learner becomes better equipped to perform independent mental actions. Verbalisation is noted to be key to this process, allowing greater concentration on motor activities and memorisation of methods. Later, as motor activity is acquired and routinised, so the need for verbalisation decreases and the action becomes less conscious. Bedny, Seglin and Meister (2000) state that the changing requirements of the individual should be recognised and catered for so that learning takes place effectively and that "*instructions in the learning process should be changed based on the stages of skill and knowledge development*" (p415).

The complexity of the work being undertaken determines the level of interaction with, or dependency upon, external signs and objects. More complicated tasks, or tasks for which the individual has little or no prior experience, require the support of more external signs and objects (Bedny, Seglin and Meister, 2000). It could also be construed that changes in the level of complexity of a given work arrangement may also result in changes in the level of interaction between the individual and external signs and objects. Consequently, more complex tasks involve greater degrees of internalisation as the level of social interaction also increases. This may be seen as the mechanism that drives internalisation, which Engestrom (2000a) has criticised in traditional models such as Nonaka's for failing to explain, and that Bedny, Karwowski and Bedny (2001) identify as "*a complicated transition from external material activity to internal cognitive activity*" (p413).

3.1.3 Structure of Activity Theory

Thompson (2004) criticises Blackler et al's (2000) adaptation of the original representation of Activity Theory on the grounds that their use of the collective as the unit of analysis is "*inconsistent with the clearly practice-based ontology of 'original' activity theory*" (p589). Although this and Blackler's (1995) earlier works are valuable Thompson (2004) stresses the importance of the individual during study. Engestrom (2000b) also warns of enlarging the units of analysis to encompass group-wide or organisation-wide activity networks, preferring instead to

focus upon the complexity of interactions at the micro scale. Lektorsky (1999, p65) criticises some perspectives of Activity Theory that identify it as an approach that represents humans as "*simple executors of plans, orders, and standards imposed from outside*". Contrasting these perspectives, he maintains that humans are "*essentially creative beings*" continually conditioning and creating their environment.

Ardichvili (2003, p1, Figure 1) details the entities that are observed or found in Activity Theory as:

Objects	an area of practice where participants are trying to develop expertise or expand their mastery or understanding.
Subjects	the stakeholders or groups of stakeholders including learners, trainers and other employees of the organisation.
Rules	codes of discovery, either established learning practices or other implicit or explicit practices designed to facilitate learning.
Instruments	broader than the term Tools, encompassing self-study materials or simulations.
Community	stakeholders that will exchange knowledge with the learners either during or after the activity.
Outcomes	individual learning, knowledge and skills, plus, and expanded understanding of knowledge and learning itself.
Division of Labour	the relative roles of the stakeholders in the process; such as learners and instructors.

He further notes that an Object may be the "*focus of study of some discipline (e.g., general accounting rules in financial accounting)"* (Ardichvili, 2003, p9). Bedny and Karwowski (2004) define a further type of object that is artificial, created by individuals to regulate their actions and termed Artefacts. Actions may be further divided into Operations

such as grasping, moving or holding, and this has informed a variety of organisational time and motion study methods including MTM2 (Bedny, Seglin and Meister, 2000).

Bedny, Karwowski and Bedny (2001) identify the major unit of analysis of Activity Theory as the Activity and this is comprised of one or more Actions. By performing these Actions an individual achieves a conscious goal. Actions are either motor or cognitive; transformation of material or tangible objects, or the transformation of concepts and nonverbal signs, respectively. Activities are directed toward Objects and may be accomplished through the use of a Tool: use of tools is termed instrumental action.

Activity Theory, according to Bedny et al (2000), is said to describe the components of an activity and the way in which they are related. Activity is said to begin when an object or event emerges or becomes apparent that can satisfy a need. "*A motive compelling a man to work may come from the need to earn a living for basic sustenance*" (p177), in this case 'working' is the goal. "*Goals represent imaginary and logical components of future results of one's own actions*" (p177), for example, an object may therefore be the goal for an activity. In other words, activity begins when it is possible to take action which (if successful) results in the achievement of a goal (desired state or outcome) that satisfies a need.

Bedny and Karwowski (2004) identify the two basic mechanisms of motivation, 'sense formative and 'inducing'. Sense formative motivation is dependent upon an individual's emotional attitude or perspective toward achieving a particular goal. It is based upon subconscious drives and prior experiences. For example, one's degree of hunger would influence the motivation to 'find food'. Inducing motivation is related to 'motives' and can be expressed as the energy expended in achieving a particular goal. The mechanisms of self-regulation are crucial during the performance of Activity since there is continuous disagreement between the goals and the results. Activity and knowledge are therefore "*incrementally and iteratively reconstructed*" (p150).

Figure 3.1, shows how the six elements depicted within Activity Theory conspire to generate disturbances, or tensions, that affect the activity being performed. The 'Subject's' engagement with an activity to achieve the 'Object' is mediated by the factors of 'Rule', 'Community' and 'Division of Labour'. It is also affected by the 'Tool' being employed and by the internal mental state of the individual, such as their relative levels of motivation.

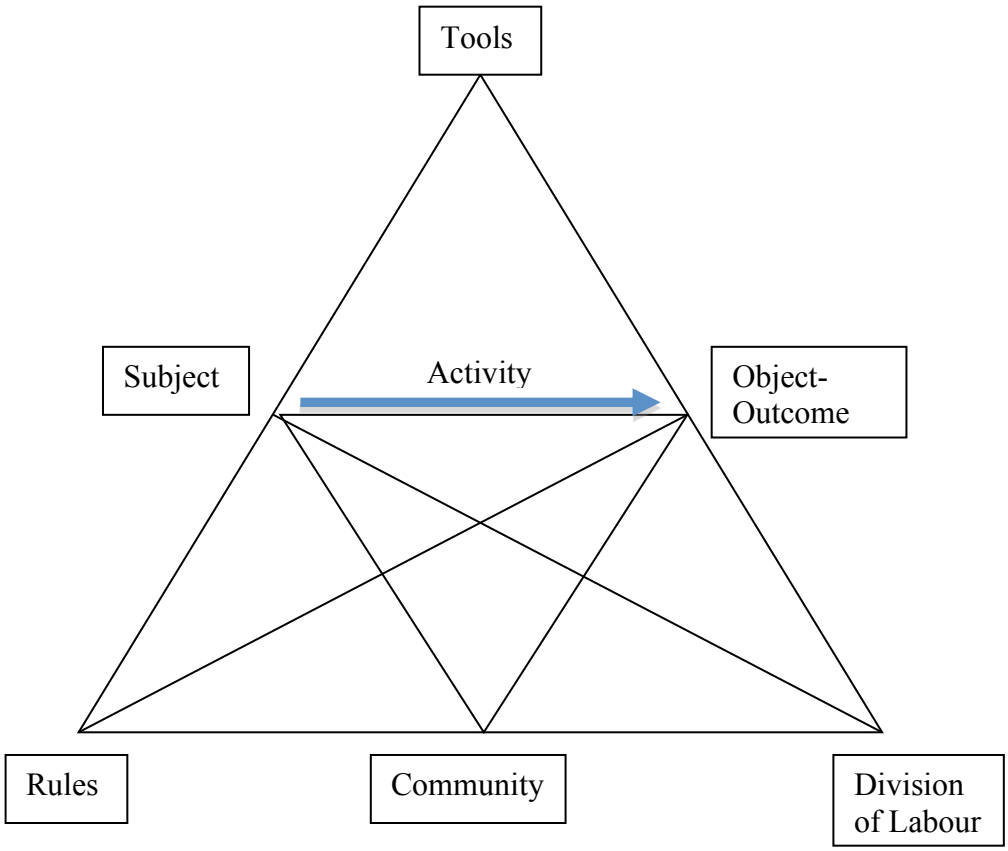

Figure 3.1, Activity Theory Framework

3.2 Adopting Activity Theory for the Study of Knowledge Acquisition

Central to the Activity Theory framework is the activity that is to be performed and thus forms the unit of analysis. Although the objectives of the KTPs with each organisation appear markedly different (section 1.6), they each aimed to deliver significant business improvements through the development of the business processes, using Process Mapping.

3.2.1 Research Framework

As shown in Figure 3.1 above and discussed in section 3.1.2 and 3.1.3, Activity Theory comprises six separate elements that influence the performance of an activity by an individual. These six elements can be seen to encompass the complexity of factors that were identified in Chapter 2 as being significant to the process of knowledge acquisition (Table 3.1). As such Activity Theory is offered as an appropriate research framework for this study.

Table 3.1 – Comparison of Activity Theory elements and factors that influence the processes of knowledge acquisition

Influential Factors	Activity Theory Elements
The individual	Subject
Interaction between individuals	Community
Individual's mental state	Subject
Reward and Motivation	Rules
Performance of activity	Tool, Activity and Object
Management support & opportunity	Community, Rules and Division of Labour
Time	Significance of study over time (section 3.1.2, Engestrom, 2000b)

The 'Activity' that is the focus of this investigation is therefore the performance of generating Process Maps. The KTP Associate that performs the activity is therefore the 'Subject' upon which the study is made and the 'Tool' that they employ is that of the business improvement tool Process Mapping. The 'Object' or outcome of the process mapping activity is a completed Process Map. It is important to note that Process Mapping has been identified as an approach for generating not just representations of the current conditions but also for generating designs for future processes or desired states: discussed in section 2.3.1. This thesis focuses upon the initial generation of process maps in each of the KTPs being studied. However, in recognising the value of Process Maps for the improvement of business processes, the concluding chapter to this thesis remarks upon their subsequent use for this purpose.

It is important to note that the phrase 'process mapping' may be employed both as a noun, to indicate the 'Tool' being used and the 'Object' produced, as well as a verb to indicate the 'Activity' being performed. Figure 3.2 shows how the elements of Activity Theory have been defined to reflect the specific nature of this study; the organisational components and the nature of the work undertaken in each Knowledge Transfer Partnership.

This research, through examining the tensions and disturbances around the work undertaken by a KTP Associate, focuses upon the knowledge that is acquired by that individual. It is recognised that other individuals involved in the activity of process mapping may also be in a position to acquire knowledge. However, in keeping with Activity Theory's insistence upon the individual as the focus of enquiry, this thesis bounds its study of knowledge acquisition to that of the KTP Associate.

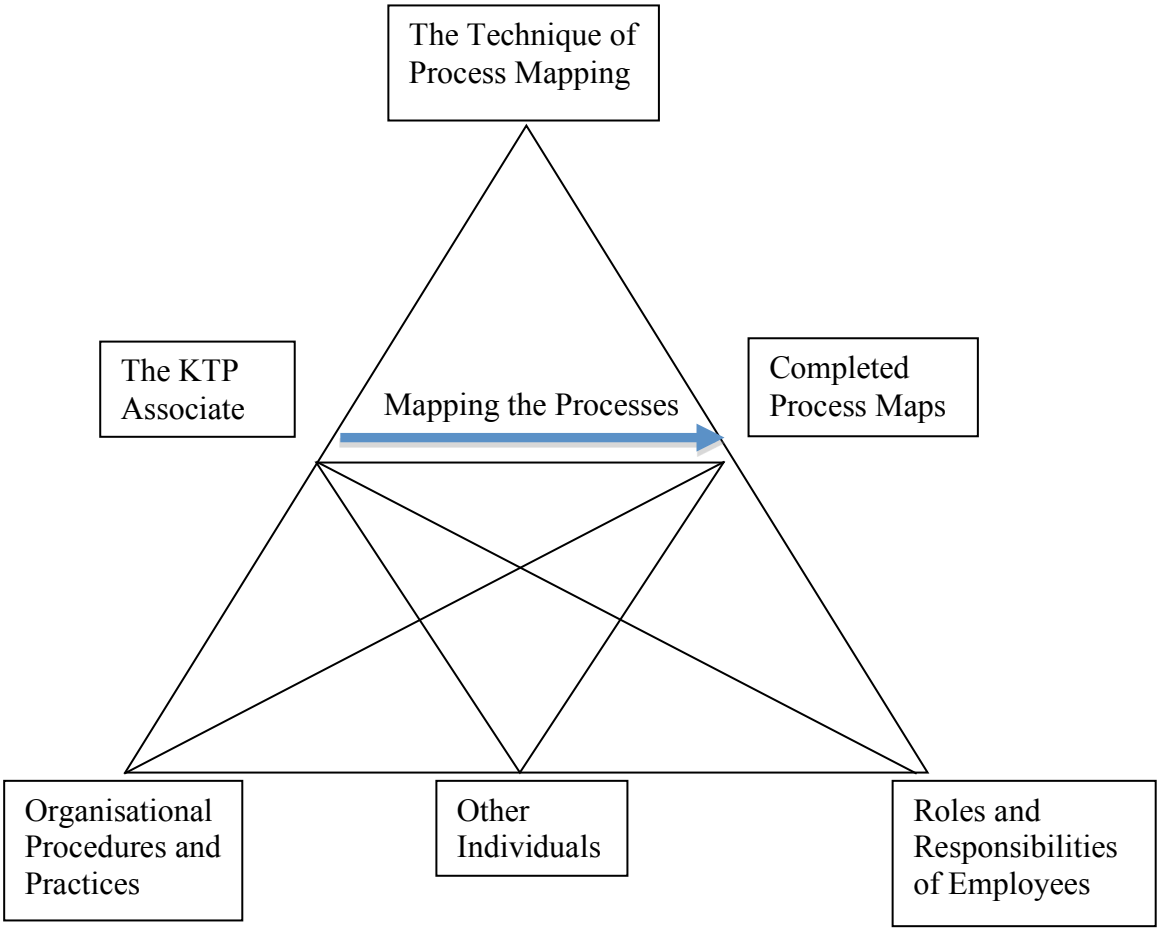

Figure 3.2, Activity Theory elements defined within this study.

3.3 Summary of Research Framework

Activity Theory is a conceptual framework that enables the study of knowledge in a manner that is commensurate with the concept of 'knowledge as knowing' that is adopted within this thesis.

The factors that have been identified in Chapter 2 as being influential in the process of knowledge acquisition are shown to be captured within the elements of the Activity Theory framework. Activity Theory is therefore selected as the research framework by which this study is made of knowledge acquisition in three Knowledge Transfer Partnerships through the performance of process mapping.

Activity Theory uncovers the tensions between individuals and the elements of their environment that form and reform over time and thereby affect the individual's ability to successfully engage in work-based activity. These tensions serve to impede the successful performance of work-based activity and thereby mediate the process of knowledge acquisition.

By uncovering these tensions, using Activity Theory, this study aims to understand the factors that mediate knowledge acquisition in KTP Associates through the performance of Process Mapping in Knowledge Transfer Partnerships that deliver business process improvements.

4.0 Methodology

This chapter discusses the approach taken in this thesis in order to investigate the factors that mediate knowledge acquisition through the performance of Process Mapping in Knowledge Transfer Partnerships that deliver business process improvements.

Chapter 3 discussed the adoption of Activity Theory as the research framework to guide this thesis. This chapter discusses the operationalisation of Activity Theory to identify the factors that mediate knowledge acquisition.

The first part of this chapter, section 4.1, discusses the philosophical positioning of this study that adopts an interpretivist approach to the study of the factors that mediate knowledge acquisition. It utilises a Participatory Action Research (PAR) strategy, employing multi-site triangulation and cyclic data capture and analysis over an extended period of time.

Section 4.2 details the methods of data capture, interview transcription and analysis that were employed.

Section 4.3 discusses the ethical aspects of this study and the measures taken to protect the interests of those individuals involved in its completion.

4.1 Research Design

This section discusses the philosophical positioning of this study that adopts an interpretivist approach to the study of the factors that mediate knowledge acquisition. It then details the adoption of Participatory Action Research (PAR) strategy, employing multi-site triangulation and cyclic data capture and analysis over an extended period of time.

4.1.1 Philosophical Paradigms

Jonas and Hannum (1994) recognise the difficulties in generating an account of the development of philosophical direction of research due to the lack of clarity between epistemological and ontological perspectives that appear to gain and lose support as fashions change (Hassard, 1993).

Brannen (2005) notes that many aspects of professional research, including political influence and power, are in fact leading toward a greater divide between quantitative and qualitative approaches.

In relating the criticisms that Bourdieu's reflexive sociology has received, Kyung-Man (2009) asserts that "*science is…replete with struggles for power, hegemony and dominance*" (p 76). Bourdieu's (Wacquant and Bourdieu, 1992), Giddens' (2008) and others' sociologies of science may not agree on the causal mechanisms for such dissonance but all identify that ontological and epistemological dominances or fetishes are determined by many things other than the search for absolute truth.

There are numerous arguments placed against particular paradigms of science by proponents of competing perspectives. Most notably the epistemological discussion revolving around deductive versus inductive methods. For example, Morgan and Smircich (1980) noting that social scientists, in using "*quantitative approaches…are in effect attempting to freeze the social world into structured immobility*" (p498) and assert that in open (social) systems "*scientists can no longer remain as extended observers*" (p498). Brannen (2005) even notes that the ongoing practice of, and preference for, particular methods or approaches serves to structurate the epistemological and ontological functionalist divide, thereby further limiting the opportunity for methodological convergence.

Numerous works have examined the potential for unification and standardisation of the scientific learning community (Onwuegbuzie and Leech, 2005; Balsinger, 2004; Kanis, 2004 ; Knox, 2004 ; Lilford and Braunholtz, 2003 ; Cinquegrani, 2002; Hallett, Chandler and Krettenauer, 2002; Steffy and Grimes, 1986; Bryman, 1984 ; Morgan and Smircich, 1980; Jick, 1979; Pohland, 1972 ; Sinclair, 1951). As long ago as Jick (1979) it was noted that there was a growing call for combined qualitative and quantitative approaches to research in social sciences yet there has been relatively little discussion or direction as to how it may be practically accomplished (Rihoux, 2006; Plewis and Mason, 2005).

Whittemore, Chase and Mandle, (2001) highlight the historical tensions between qualitative and quantitative research, particularly noting the need therefore to improve validity in interpretive studies that contain mixed methods. They indicate a growing trend toward eschewing traditional or imposed philosophical and methodological fashions and favouritism in favour of more innovative and enlightening approaches: it is considered legitimate to combine "*philosophies, epistemologies and methodologies*" (p525) to create approaches to research that best fit the question at hand, although these are likely to further reduce the validity of the enquiry.

Whilst the core methodological debates appear to centre on the adoption of objectivist/subjectivist viewpoints or quantitative/qualitative methods, others even argue for the consideration of minority alternatives such as fallibilism (Powell, 2001). Burrell and Morgan (2003) assert that each of the many 'schools of thought' may be represented within one of four global sociological paradigms based upon its founding meta-theoretical assumptions and that each of these sociological paradigms presupposes the adoption of a specific set of methods by which enquiry is made. In essence, that positivist enquiry generally utilises quantitative methods and interpretivist enquiry utilises qualitative methods. Whilst this nebulous grouping has become widely recognised and adopted for its clarity of explanation of multiplicitous sociological perspectives, the association of particular methods of enquiry with specific epistemological viewpoints has been challenged (Knox, 2004; Bryman, 1984). Consequently, there is as much dispute over the credibility of methods of enquiry within individual paradigms of learning as there is between those paradigms that are apparently incommensurable (Midgley, 2003; Goulding, 1999; Jonas and Hannum, 1994; Maynard and Clayman, 1991; Zimmerman, 1988).

Subsequently, unlike the natural sciences, social science philosophy and therefore research in general, has failed to identify and adopt a common methodology (Jonas and Hannum, 1994). In fact, there has been perceived to be an increasing divide among qualitative and quantitative paradigms and researchers that is destructive to the practice of research (Onwuegbuzie and Leech, 2005). Interestingly however, Sinclair (1951),

whilst recognising the problems that abound research, adopted a perspective that is more encouraging when commenting upon the fashionable epistemological perspectives of his time and states that there is "*confusion...and sometimes perverse dogmatism*" but that they are "*much better than they once were*" (p16-17).

Recognising the tensions that may influence the adoption of a particular philosophical paradigm, discussed above, this study adopts an interpretivist approach to the investigation of the factors that mediate knowledge acquisition. The importance that is placed upon assuring the validity of interpretive enquiry by Whittemore, Chase and Mandle (2001) is explored further in section 4.1.3 and the methods adopted in this study are discussed.

The next section discusses the selection of a strategy for the study of the factors that mediate knowledge acquisition. It discusses Action Research approaches and the adoption of Participatory Action Research.

4.1.2 Research Strategy

Activity Theory appears not to be linked with any single philosophical perspective: Engestrom's view of activity systems, and thereby Activity Theory, maintains that they can neither be analysed from a realist, constructivist nor constructionist perspective: "*while the notion of perspective offers a useful heuristic, its theoretical characterisation remains weak*" (2000, p308). As such, the adoption of Activity Theory as a research framework or lens, does not necessarily command the use of exclusively deductive or inductive approaches. Tolman however discusses the methodological requirements of Activity Theory, noting its "*utter indifference…to variables*" and thereby suggesting its placement within the interpretivist paradigm (in Engestrom, Miettenen & Punamaki, 2005, p78; Burrell and Morgan, 2003). This research, to understand the factors that mediate the acquisition of knowledge through the performance of process mapping in KTPs, therefore takes the form of an interpretive study.

This study of three Knowledge Transfer Partnerships involves the researcher as an active agent in the organisations being studied. This section discusses the adoption of a research strategy that is commensurate with the situation being investigated and identifies Participatory Action Research as an appropriate approach. It also highlights those factors that are pertinent in performing high quality research.

4.1.2.1 Action Research

Action Research (AR) comprises a range of subtly different approaches to undertaking research (Checkland and Holwell, 1998; Sanday, 1979). AR places the researcher in a position that is immersed, to greater or lesser degrees, within the research environment in order to undertake first-hand and detailed observation. The origins of AR are not entirely clear but are most usually associated with the work of Kurt Lewin (Gronhaug and Olson, 1999; Eden and Huxham, 1996; Masters, 1995; Susman and Evered, 1978). Lewin conceptualised AR as a cycle of researcher activity involving phases of planning, acting, observing and reflecting (Masters, 1995), alternatively titled analysis, fact-finding, conceptualisation and planning (Gronhaug and Olson, 1999).

The extent to which researchers are immersed in the field of research varies to great degrees. Masters (1995) points out the four main themes within the AR literature: the empowerment of participants, collaboration through participation, acquisition of knowledge and social change. Gronhaug and Olson (1999) also note that there can be a distinction drawn between the levels of participant involvement whereby they vary from a role of investigator and catalyst of change, to active participant in research construction and implementation, to a lesser one of participant in the phenomenon under observation only. Eden and Huxham (1996) point out that "*Action Research has become increasingly prominent among management researchers as an espoused paradigm used to justify the validity of a range of research outputs*" (p7), research output that "*results from an involvement with members of an organisation over a matter which is of genuine concern for them*". But they maintain that

Action Research, contrary to many definitions and descriptions, is not solely concerned with delivering organisational changes. They also maintain that most agree that Action Research is generally collaborative in nature but they contest that this must be the case. One could construe that the level of researcher immersion is to some degree related to the need to not only gain understanding of the phenomena but the need also to effect change.

Gronhaug and Olson (1999) point out that while Action Research is often associated with a tendency to change and improve social systems it is also "*an important source of acquiring insights about social systems*" (p9) and that "*there is little doubt that action research has the potential of producing important and useful knowledge of people in context*" (p12). Susman and Evered (1978) reflect the conflict between competing epistemological paradigms when relating that "*our relative lack of understanding of action and its effects is further evidence of the epistemological shortcomings of positivist science*" (p599) but that "*Action Research provides a mode of inquiry for evolving criteria by which to articulate and appraise actions taken in organisational settings*" (p599).

Gronhaug and Olson (1999) recognise that AR can contribute to the quality of research and provide some degree of generalisable findings by triangulation through making "*systematic comparisons of findings generated in other settings*" (p12). However, such generalisability is not often achieved simply because many action researchers fail to adequately explain the process by which they cyclically developed their research approach.

In discussing the generalisability of the findings of AR investigations Gronhaug and Olson (1999) concur Checkland and Holwell's (1998) earlier statement that "*since any organisational situation at a particular time, with its particular participants having their own individual or shared histories, may be unique, it cannot be guaranteed that results can be made richly meaningful to people in other situations*" (p17). However, by providing rich evidence of the process by which the research was conducted, it may be claimed to possess a degree of 'recoverability' that

"*will help to justify the generalisation and transferability*" (op cit, p17). They discuss what constitutes 'recoverability' and suggest that "*the aim in AR should be to enact a process based on a declared-in-advance methodology…in such a way that the process is recoverable by anyone interested in subjecting the research to critical scrutiny*" (op cit, p18).

Eden and Huxham (1996) discuss the issue of validity in AR and state that it is concerned with "*the degree to which the results may both be justified as representative of the situation in which they were generated and have claims to generality*" (p82). They proffer that multiple studies (triangulation) are hailed as being useful in improving Action Research reliability and validity. Also that triangulation may be conducted during data analysis as participant accounts are compared and contrasted with researcher's observation, especially over time. Furthermore, and echoing the importance of the cyclic nature of this form of enquiry, they state that the investigative measures that evolve over time also become mechanisms of triangulation in themselves. Sanday (1979) commenting that extended studies take place over durations of "*at least a year*" (p527) and suggest that more modest investigations may be undertaken within this time.

Eden and Huxham (1996) conclude with an observation of the complexities that beset undertaking an AR research strategy: "*Action Research is an imprecise, uncertain and sometimes unstable activity compared to other approaches to research. Enacting the standards in practice demands holistic attention to all the issues. Given the complexity and pressure of the real world action research setting, this provides a major challenge. Indeed it is probably an unachievable challenge, though this should neither deter researchers from trying to achieve the standards nor, worse perhaps, from using Action Research at all*" (p84).

4.1.2.2 Participant Observation

Participant Observation (PO), and its derivatives, are a specific form of AR and as Eden and Huxham (1996) concluded in the previous section the literature portrays a complex range of issues that need to be

addressed by the research practitioner. Confusingly, PO is poorly defined within the literature, being cited or defined as a methodology (Pohland, 1972) or a method (Vinten, 1994). Jackson (1983) compounds the lack of clarity within the PO literature when he classifies it as a "*technique which can be effectively employed in isolation from other research procedures"* (p40), later terming it a *"method with which an attempt to transcend the epistemological gulf between 'insider' and 'outsider' can be made*" (p44). Others describe PO in more similar terms, as a "*research design strategy*" (Bositis, 1988, p333), or "*a process in which the observer's presence in a social situation is maintained for the purpose of scientific investigation*" (Schwartz and Schwartz, 1955, p344), and as an "*umbrella word*" (Gans, 1999, p540) that encompasses a wide range of research practices.

The broad range of uses of PO is recognised by Pohland in his review of the various nomenclatures used to identify it within the literature, noting that "*the lack of consensus in aims, procedures and outcomes is indicated by the variety of terms used to describe the methodology*" (1976, p6). However, "*one of the few areas of agreement among participant observers is that the methodology characteristically embraces not one but a blend or combination of methods and techniques*" (op cit, p11).

Whyte (1989) proffers Participatory Action Research (PAR) as a form of action research that is rooted within the action research paradigm but distinct from two other forms in which it is practiced. One form, 'participant observation', requires the observer to blend into the research field to observe the 'natural' behaviours of the field's actors, which Whyte declares as being "*not entirely possible*" (p368). The alternative form, 'participatory research', requires further involvement from those being researched to the extent that they may become involved in the research design and data analysis itself. Whyte offers PAR as a middle-ground between these two forms of action research that "*combines participant observation with explicitly recognised action objectives and a commitment to carry out the project with the active participation in the research*

process by some members of the organisation studied" (p369). Whyte is quick to point out that while PAR projects are growing in number there is no uniformity in the ways that practitioner participation is managed.

As with AR in general, the problem of researcher role is one that attracts considerable attention in the PO literature. It must be noted however, that it has resulted in precious little advice or instruction as to how the researcher may balance these changing roles in practice. Wade (1984) identifies several different roles that may be played: observer as counsellor, observer as informant and collaborator, and observer as teacher, and comments that "*methodological guidance for researcher role-taking in studies conducted where the observer is employed and has a distinct, official role is rarely found*" (p212). Bositis (1988), like many others, also identifies numerous roles that the researcher may adopt when undertaking PO: complete participant, participant-observer, observer-participant and complete observer. Jarvie (1969) identifies the often juxtaposed role of PO researchers as "*both a stranger and a friend among the people he is observing*" (p505), Vidich (1955) also reflecting the prime concerns within the literature that the paradoxical tension for the researcher of being both observer and participant are of paramount importance.

Bourdieu (2003) highlights the paradoxical tensions that beset the researcher that utilises PO, who are attempting to "*be both subject and object, the one who acts and the one who, as it were, watches himself acting*" (p281). He offers 'Participant Objectivation' as an alternative perspective to the use of Participant Observation that relies upon a reflexive objectivation of the observer themselves. He is quick to point out however that this is different to the narcissistic reflection "*verging of exhibitionism*" (p282) that has profligated in the field. Although he cites personal examples where such objectivation has lead to a novel and valuable interpretation of field observations it is not entirely clear how this approach can be practically and reliably operationalised by the practicing researcher.

Adopting a role that is deeply embedded within the research context affords advantages that arguably cannot be achieved by other approaches. As Vinten (1994) states "*by being immersed in the events in progress, the researcher hopes to be in a position to obtain much more information and a greater depth of knowledge than would be possible from the outside looking in*" (p30). However, "*observation alone avoids interaction, and so has strictly limited use for research to those cases where observation and objective recording alone are required*" (p31) but contrastingly that "*the mere presence of the observer may affect the actions of the observed*" (p32).

Schwartz and Schwartz (1955) also recognise the effect of the observer upon the situation being studied but also the effect of the subject of observation upon the situation, where they "*form a context which would be different if either participant were different or were eliminated*" (p346). They claim that even while the researcher's role can be deliberately managed to some degree, the "*emotional interplay between the subjects or between himself and the observed*" cannot (p347). This is an inherent problem for almost all scientific enquiry and one which seems an inescapable or avoidable conclusion. Although, as Jick (1979) comments and is discussed in the preceding sections, "*the* [qualitative] *analysis benefits from perceptions drawn from personal experiences and firsthand observations*" (p609).

The degree to which the observer is embedded in the research context is also dependent upon time, requiring both sufficient time to 'become part' of the environment or society being studied and sufficient time to observe and collect data on the salient phenomena. The continuity or frequency of contact is also of importance, as Vinten (1994) notes "*with interrupted involvement the researcher is only present on a spasmodic basis, and so lacks a longitudinal perspective and is unlikely to be able to experience much direct participation*" (p31). A further issue for the researcher then becomes one of 'disengagement' or identifying both the point at which the end of the study can be identified and, less obviously, managing the psychological difficulties of readjusting to 'normal' life (Snow, 1980).

The issue of continuity is raised by Vinten (1994) who notes that maintaining rigour during PO based research can be troublesome, citing the dogmatic need to break off discussions in order to record a salient point in the researcher's notes against the practical need to maintain discursive momentum. Becker (1958) highlights that PO usually involves sequential data gathering and analysis, "*further data gathering* [taking] *its direction from provisional analysis*" (p653) reflecting the cyclic nature of this form of research stated by Kurt Lewin. The quality of future enquiry is therefore dependent upon the completeness and accuracy of the data that has thus far been captured. It therefore becomes necessary to be selective in what material is recorded, that selection also being dictated to some degree by the exigency of the situation. Schwartz and Schwartz (1955), in discussing the process of observation-recording-reflexion undertaken by PO researchers, note that much of the reflective analysis and interpretation goes on without deliberate intent. It may therefore be unclear to third parties the criterion by which some data was recorded and presented. Becker (1958) notes the difficulty therefore in presenting qualitative data analysis in meaningful ways without resorting to providing lengthy biographies or narratives. He offers the notion of portraying the data and its analysis in chronological fashion, showing how the data gathering and analysis took place over time.

It must be noted that PO is not "*an informal and idiosyncratic observation process*" (Bositis, 1988, p334) but should follow a clear structure of what is and what is not to be included. He states that a common failing of many PO studies is their lack of error checking, and therefore a lack of any ability to claim generalisability. This can be overcome to some degree by offering analyses spanning multiple organisations or instances of study. He also maintains that such problems can be overcome by providing clear theoretical basis for the study at all times.

Extensive contact with research subjects over time, in often competing roles of both researcher and collaborator, can result in ethical problems. Jarvie (1969) ultimately gives primacy to the doxic values of the researcher and his own scientific community when he postulates "*that the*

observer does himself no harm if he acts in integrity towards his society and its values as far as possible" (p508). Arnould (1998) draws upon the American Anthropological Association's guidelines for ethical research when concluding that "*my primary responsibilities lay with 'the people with whom I worked*'" (p73) and states that allegiance must lie with the society within which the researcher has attempted to become embedded. Without universally accepted guidelines it is likely that in practice the lone researcher shall be generally guided by the ethical guidelines of the institution for which the research is being performed, however, it is also possible that situations may occur whereby the individual's own ethical position will govern their actions.

This section has discussed approaches to Participant Observation and has identified PAR as a suitable method for this study. PAR overcomes the problems identified in alternative approaches that require either the seamless blending of the researcher into the field of research or their total removal, in order to minimise or remove observer influence. Whyte (1989) proffers that PAR affords the opportunity to carry out research with the involvement of those involved in the field of research and this reflects the nature of the research undertaken for this thesis.

The following section discusses the approaches that were taken to address the issues around the quality of interpretive study that were identified in the previous sections. These include the general observations of Whittemore, Chase and Mandle (2001), Jick's (1979) recognition of the value of first-hand observation and analysis, Vinten's (1994) requirement for long-term immersion of the observer in the field of research and Becker's (1958) and Schwartz and Schwartz's (1955) recognition of the purpose of cyclic data collection and analysis.

4.1.3 Quality in Interpretive Study

One of the main criticisms of interpretive enquiry that has perhaps hindered the development of a single framework for a supradisciplinary approach to research is its relative and perceived lack of rigour: "*It is fair to say that …analysis of qualitative data is a mysterious, half-formulated*

art" (Miles, 1979, p593). Contrastingly Johnson, Buehring, Cassell and Symon (2006) eschew the pursuit of rigid methodology and conclude that "*trying to articulate one set of all-embracing, indisputable, regulative standards to interrogate and methodologically police qualitative management research, so as to discipline practitioners, would seem both a forlorn hope and an unfair practice*" (p146). They call upon practitioners to be reflexive to "*empower audiences by enabling their understanding of the philosophical context in which the work was carried out*" (p148). Lowes and Prowse (2001) further argue that it is in fact desirable and necessary for the researcher to impart their personal subjectivity to the analytic process. As Bourdieu (Wacquant and Bourdieu, 1992) maintains, it is the investigator's relation to, and effect upon, the phenomenon under observation that they should seek to understand and include. Goulding (1999) however claims that preventing misinterpretation during phenomenological enquiry requires the researcher to throw off all previous ontological judgements. A Heideggerian perspective would maintain that this task is ultimately futile because the very act of dismantling all 'pre-understanding' becomes itself a facet of the reflexive human intuition (Skoldberg, 1998) and implies that the researcher must be careful to avoid the trap of becoming narcissistically reflexive (see also section 4.1.5).

Various approaches and techniques have been described for improving the quality of qualitative study that has been termed "*an approach rather than a particular set of techniques*" (Morgan and Smircich, 1980, p499). Whittemore, Chase and Mandle (2001) note that "*attention to both process and product…contribute to validity and subsequently quality in qualitative research*" (p534). Johnson, Buehring, Cassell and Symon (2006) venture though that the criteria by which we judge the 'quality' of management research, including validity and reliability, are products of quantitative, positivistic modes of enquiry. That subsuming such measures into qualitative research without modification is erroneous.

Jick (1979) provides more practical instruction in improving qualitative study by triangulation. He identifies the alternative methods of triangulation as:

- Methodological triangulation, using different methods to explore a phenomenon such as interview, observation and content analysis.

- Instrumental triangulation, using multiple scales or focus groups to establish internal consistency.

'Basic' triangulation usually takes the form of using qualitative analysis to strengthen quantitative measurement, termed "*convergent validation*" (p603) whereas 'advanced' triangulation or "*holistic description*" (p603) is where "*qualitative methods, in particular, can play an especially prominent role*" in conjunction with quantitative analysis (p603). Furthermore and in parallel with a Heideggerian perspective, Jick ventures that "*the* [qualitative] *analysis benefits from perceptions drawn from personal experiences and firsthand observations*" (p609).

Guest, Bunce and Johnson (2006), in their investigation of qualitative research methodologies used in the health sciences, identify the recurrent theme and importance of 'theoretical saturation': "*theoretical saturation"* – the point at which *"no additional data are being found*" (Glaser and Strauss, 1967, p65). However, a satisfactory or practical guideline for what constitutes saturation was not evident neither in this body of research nor in the wider literature.

Their analysis concluded that after 12 interviews, there were no further emergent themes and that asking a structured set of questions can lead to rapid 'saturation'. They also notice that some studies may be undertaken in more routinised, homogenous populations and environments, where Romney, Weller and Batchelder (1986) assert that as little as four individuals can provide sufficient data. The more homogenous the population, the more quickly that 'saturation' is achieved.

Miles (1979) highlights a significant difficulty with qualitative enquiry, that "*collecting and analysing the data is a highly labour-intensive operation*"

(p590), but that primary data reduction is one such way of reducing the burden of qualitative study. Several further 'good practices' were unearthed by the investigators in Miles' study to improve qualitative enquiry and analysis:

- Intertwining of analysis and data collection
- Formulating classes of phenomena
- Identifying themes
- Provisional testing of hypotheses

Also, that multi-site study is useful for it allows the specific quirks of each site to be seen in contrast with other sites and, "*self-delusion about conclusions is less likely*" (Miles, 1979, p598).

This section has identified the pertinent issues that determine the quality of interpretive enquiry. Specifically, the observations of Whittemore, Chase and Mandle (2001), Jick's (1979) recognition of the value of first-hand observation and analysis, Vinten's (1994) requirement for long-term immersion of the observer in the field of research and Becker's (1958) and Schwartz and Schwartz's (1955) recognition of the purpose of cyclic data collection and analysis. The approaches taken to address these issues in this study are discussed in detail in section 4.2.

The following section identifies and discusses the notion of reflexivity in interpretive enquiry. While it is a technique that has grown in significance in interpretive research it has been widely criticised. The section identifies the problems that are encountered when reflexive accounts are included as deliberate methods of enquiry.

4.1.4 Reflexivity

One of the most common methods practiced by social scientists, is that of reflexivity: in considering the continuity of social practices Giddens points out that 'reflexivity' is the "*monitored character of the ongoing flow of social life*" (p3). Maton (2003) identifies the growing trend toward reflexivity in social science research where "*it has now become a sin not to be reflexive"* (p54). Although the term reflexive is heterogeneous in

meaning, having been defined and redefined by multiple proponents, its core premise is clear, that it requires one to "*explicitly position themselves in relation to their objects of study so that one may assess researchers' knowledge claims in terms of situated aspects of their social selves and reveal their (often hidden) doxic values and assumptions*" (p54).

Maton (2003) identifies several forms that reflexivity in research has taken. Enacted Reflectivity: providing a narrative of the author's experience or journey toward their research. This approach however does not immediately indicate how the current research has been conducted or analysed – the methodological impact of the journey is untenable. Sociological Reflexivity: aims to display the epistemological dimension of the researcher's approach, showing the object of study's relation to knowledge rather than the subject's (researcher's) relation to knowledge that is presented with 'enacted reflexivity'. Individual Reflexivity: is often conducted as a "*romantic*" (p55) attempt to remove observer bias, to "*show his or her heart to be in the right place*." Narcissistic Reflexivity: this form of reflexive practice tends to place the researcher at the centre of the picture so that the object of study becomes lost. He summarises that these approaches to reflexive research comprise "*critical reflections*" (p56) rather than reflexive accounts and "*often tell us more about the knower than any nominal object of enquiry*." As Bourdieu warns, it is reflexivity not of the practice or of the theory alone, but also of the sociologist's self in order to understand their relation to the object of study. However, this should not result in "*epistemocentrism*" (2003, p69) whereby the researcher is fully removed from the societal system that they intend to understand and describe. Rather, it is their relation to, and effect upon it that they should seek to understand and include.

Maton (2003) criticises Bourdieu's mode of reflexivity that often conspire under the banner of methodological individualism and result in narcissism. In particular he aims criticism toward epistemic reflexivity that is conducted individually and not collectively – collective reflexivity being a necessary condition for the identification and acceptance of scientific

truth. He proffers the notion of a researcher reflexively assessing and thereby objectifying their relationship with an object of enquiry. This relationship is therefore objectified and the researcher's relationship to this new object may also be reflexively considered. This recursive process may continue ad infinitum, and rapidly becomes narcissistic. He asserts that Bourdieu's reflexive sociology therefore fails to provide "*a collective means for reflexive analysis of collective practices which transcends social positioning*" (p60).

Lynch (2000) counters the discussions of reflexivity that abound within the literature when he says that it "*is not an epistemological moral or political virtue. It is an unavoidable feature of the way actions…are performed, made sense of and incorporated into social settings*" (p26). He also outlines the varying ways in which 'reflexivity' has been defined and practiced throughout the literature: as mechanical reflexivity, knee-jerk reflexivity, cybernetic loopiness, reflections ad infinitum, substantive reflexivity, systemic-reflexivity, reflexive social construction, methodological reflexivity, philosophical self-reflection, methodological self-consciousness, methodological self-criticism, methodological self-congratulation, meta-theoretical reflexivity, reflexive objectification, standpoint reflexivity, breaking frame, interpretative reflexivity, hermeneutic reflexivity, radical referential reflexivity and ethnomethodological reflexivity. He remarks that reflexivity is supposed to do something that removes the hidden bias of observation and interpretation. But, that the act of reflexion is itself subject to interpretation under those same hidden values; concluding that "*there is no particular advantage to 'being' reflexive or 'doing' reflexive analysis, unless something provocative, interesting or revealing comes from it*" (Lynch, 2000, p42) and even that "*there is no single way to be, or not be, reflexive*" (p46).

It has been argued that deliberate reflexivity can result in narcissism (Maton, 2003; Skoldberg, 1998). Contrastingly, others maintain that reflexivity is an unavoidable occurrence during cyclic data capture and analysis (Schwartz and Schwartz, 1955). In accord with Schwartz and

Schwartz (1955) this study adopts the position of accepting that valuable reflexion takes place during the cyclic process of developing the investigation and thus no further deliberate act of being reflexive is operationalised. The cyclic development and analysis of this research is discussed in section 4.2.2.

4.1.5 Summary of Research Design

Situating a study within a particular philosophical and methodological paradigm may, according to some of the literature, be as much dependent upon fad, fashion and personal preference as upon the underlying requirements of the nature of the investigation. While attributing specific methods with particular research perspectives may afford the luxury of simplistic methodological development, such an approach may lead to weak or inappropriate investigation and consequently, poor science. Alternatively, combined, supradisciplinary, or triangulated approaches have been hailed as necessary developments within social science research yet there is little instruction as to how this may be practicably achieved.

Weich (1989), Nixon (2004) and Llewelyn (2003) highlight the significance of theory development and the importance of stating the theorising process in order to produce 'good theory'. Interpretive enquiry, specifically the form PAR that is adopted in this study (Whyte 1989), also recognises the importance of stating the process by which the research is undertaken in order to improve its contribution to theory (Whittemore, Chase and Mandle, 2001). Triangulation is seen as a key way in which the reliability and validity of interpretive enquiry (Jick, 1979) and AR can be improved (Gronhaug and Olson, 1999) and that it can be achieved through the use of multi-site study (Eden and Huxham, 1996; Miles, 1979) and the cyclic development of the study over time (Bositis, 1988; Miles, 1979; Sanday, 1979; Becker, 1958).

Researcher reflexivity is seen by many to be a value-adding aspect of interpretive inquiry (Lowes and Prowse, 2001), particularly in AR. However, it is argued that deliberate reflexivity can result in narcissism

(Maton, 2003; Skoldberg, 1998). Contrastingly, others maintain that reflexivity is an unavoidable occurrence during cyclic data capture and analysis (Schwartz and Schwartz, 1955) and even that qualitative analysis actually benefits from personal experience and observation (Jick, 1979). As such, this study adopts the position of accepting that valuable reflexion takes place during the cyclic process of developing the investigation and thus no further deliberate act of being reflexive is operationalised.

In order to address the issues that may improve the quality of this interpretive study the following section details the way in which this study was conducted. It discusses the data capture methods and cyclic development of the research questions over time, and how they were adapted to reflect the emergent themes identified at each of the three research sites. It also details the method of interview transcription and data analysis that were employed.

4.2 Data Capture and Analysis

This section discusses the operationalisation of the research questions that were used to explore tensions and disturbances between the six factors within the Activity Theory framework.

It details how this study was conducted. Firstly, the observations of the researcher, made through Participatory Action Research and immersion in the organisations in the role of Academic Supervisor for each KTP, is discussed.

Following this the approach to developing the semi-structured interviews is examined and the capture of data through interviews and field notes is outlined. Finally, the methods of transcribing the interviews and data analysis are presented.

4.2.1 Participatory Action Research

One of the formal requirements of Knowledge Transfer Partnerships is for the supervising academic to make frequent and regular contact with the KTP Associate (as discussed in Chapter 1). Typically this involves either the academic visiting the collaborative organisation or the Associate

visiting the partner university. Visits usually alternate between both locations and occur twice per month. In practice, the frequency of site visits varies, becoming more frequent during periods of increased project activity, or during times when the academic's specific skills and expertise are required to solve problems or assist in developing the project plan. In addition to this are the four-monthly formal project reviews, termed Local Management Committee (LMC) meetings, attended by Academic and Industrial Supervisors, KTP administrative staff from the university and regional KTP advisors. At the LMCs the project was reviewed against the project plan, future plans were discussed, budgets were reported and the Associate's personal development were discussed. In addition to these workplace and university site visits contact between the academic and Associates was maintained by the frequent use of email, telephone and the use of social networking media.

A minimum of thirty hours of formal, on-site observation and discussion was undertaken at each of the three research sites – an average of 40 hours observation and discussion occurred at each site. In addition to these formal monthly visits and four-monthly LMCs the lead academic undertook further site visits. The majority of these were requests by the Associate for guidance and advice to maintain project progress. These visits also typically lasted between four and six hours and these were used as opportunities to further discuss the project progress, examine the work completed to date and discuss future plans.

4.2.2 Data Capture

Data capture was primarily undertaken via a series of semi-structured interviews with the KTP Associate who was responsible for undertaking the partnership project with each organisation. Interviews were conducted over a period of approximately one and a half years to reflect the importance that Activity Theory places upon the development of tensions between elements over time. Four interviews were planned to be undertaken with each KTP Associate over the project duration: the research was designed to enable further interviews to be undertaken, if

required, to ensure the point of ‘theoretical saturation’ had been reached (Guest, Bunce and Johnson, 2006).

Initial interviews were undertaken near the start of each project with subsequent interviews spaced throughout the ensuing year at times that were dictated by a combination of several factors. These included researcher availability, interviewee availability and identification of significant points in the project where some milestone had been reached or after a period of pertinent project activity. The dates that interviews were undertaken with each Associate are shown at the beginning of each section of the analysis chapters.

Each interview transcript comprised approximately one and a half hours of recorded discussion. This was distilled from the completed transcripts of interviews that averaged two hours duration: some of the interview discussions were made around commercial, technical or personal aspects of the projects, and having no relevance to this enquiry they have been omitted.

The initial interview questions that were developed were common to all three KTP projects since they were undertaking fundamentally similar work: that of undertaking Process Mapping to effect improvements in business processes. There are minor exceptions to this that reflect the researcher’s knowledge of the project status due to prior involvement with the collaborative organisation.

Although the semi-structured interview questions were operationalised in advance, they were modified, or others were included, during the interview process to further investigate salient or interesting issues. The importance of showing the cyclic process of data capture and question development is key to a participant observation strategy (Becker, 1958): it is also recognised as a “*cost-effective, constructive and theoretically sound process*” (Halcomb and Davidson, 2006, p42). Appendix A shows how the research questions were developed over the course of the investigation in each organisation to specifically explore significant factors and emergent issues.

Further data capture was made through the compilation of Field Notes that were taken throughout the duration of each partnership project. These were instantaneously sampled (Paolisso and Hames, 2010) to capture pertinent and interesting points that presented during formal project meetings, informal discussions with the Associate and other members of the organisations, telephone conversations and email correspondence. These notes were used to aid the cyclic development of new questions and refine existing lines of enquiry for the planned semi-structured interviews, recognised as a key aspect of participant observation (Becker, 1958). As such, the field notes are not presented as a source of data for analysis in themselves, but were used to guide the process of data collection during the interviews. Although, on occasion, observations recorded within the notes have been used to confirm the analysis of the interviews in Chapters 5, 6 and 7.

4.2.3 Interview Transcription

The site visits offered opportunities for the Academic Supervisor to gain considerable understanding of the detail of each project. Most importantly, it also provided opportunity for the Academic Supervisor to meet key stakeholders in each project and observe their interaction with the KTP Associate, and to discuss aspects of the project with key stakeholders and other employees directly without the intervention, interpretation or involvement of the KTP Associate.

During these visits and discussions many of the tensions that Activity Theory attempts to portray were mentioned or observed. Consequently, this afforded numerous opportunities to tailor the research interview questions to pertain to relevant and current issues. The interview transcripts indicate those questions that were phrased to relate to a discussion or observation that was made earlier in the day during the site visit. For example, from the August 2009 interview at the Service KTP organisation, the researcher included a question that refers to an earlier discussion that had been captured within the field notes:

What about the team leader that said "Houston we have a problem"?

> [Here I am referring to an earlier conversation where [the Associate] retold a moment when the Finance team leader quipped "Houston we have a problem" when the system that [the Associate] had implemented developed a very minor problem]

Research interviews for this study were conducted with the three KTP Associates during both these formal and informal site visits. Locations for the interviews were chosen so that the likelihood of interruption was minimised, conversations could not be overheard and discussions were out of sight of colleagues.

Interviews were conducted in line with the questions shown in Appendix A and were recorded on digital voice recorder. Digital recordings could then be easily saved, transferred and duplicated for security. While the interviews were being conducted, points of interest and emergent questions were recorded in the field notes by the interviewer. Changes in intonation and non-verbal remarks were also highlighted and recorded.

The interviewer generated the interview transcripts as soon as practicably possible after the interview. This enabled the interviewer to incorporate any written notes of gestures and emotion in the transcripts. Undertaking the transcribing oneself also gave immediate insight into the research phenomenon and, as Miles (1979) advocates, the intertwining of data capture and analysis is a valuable approach. Emergent questions for the following interview were compiled immediately after the transcribing of each interview was completed.

Transcripts were compiled in a manner that attempts to show the pauses and breaks in the interviewee's dialogue. While there is discussion over the merits of producing verbatim transcripts (Halcomb and Davidson, 2006), the transcripts of interviews were generated by the interviewer and reproduce the interviewee's speech as closely as possible. They were also written to depict the actual non-verbal utterances of the interviewee: colloquialisms and the vernacular are also recorded in their entirety.

Short pauses in speech are indicated by ',' for example:

> *Umm, its, well, it's my delivery.*

Longer pauses are indicated by '…' for example:

> *I've done quite a number of presentations and some of them go better than others. But with this it's my...it's mine…it's my…you know…baby as it were, you know, that I've spent the last three months, you know, working on and…*

Vernacular and broken speech is recorded in full for example:

> *Umm…wh…there's two ways.*

Non-verbal remarks and other notes are recorded between '[ ]' for example:

> *Umm, I've gotta say I was, err, all kind of really 'go get em' very positive three months ago and now it's kind of like* [phew/sigh]

4.2.4 Qualitative Data Analysis

As has already been discussed in section 4.1, qualitative data analysis is recognised as being problematic, both in terms of the resources required to undertake it, and in terms of ensuring validity. Issues such as validity and reliability have been argued to be products of positivistic enquiry and are therefore not of concern, without modification, to lines of interpretivist enquiry. However, such issues may be tackled by triangulation and the immersion of the investigator into the situation being studied, and intertwining data collection and analysis.

This study attempts to maximise the quality of its data capture and analysis according to principles highlighted within the literature. As previously stated, it utilises data triangulation across three KTPs and the cyclic development and analysis of investigation over an extended period of time.

Basic qualitative data analysis usually consists of some form of identification of themes, or thematic indexing (Guest, MacQueen and Namey, 2012). Activity Theory provides some significant advantage as a research framework since the general themes and the lines of questioning are identified in its basic framework: Tools, Subject, Object,

Rules, Community and Division of Labour (depicted in Figure 3.1). These elements were used to guide the formulation of the interview questions that were used in this study and were subsequently used to guide the thematic analysis of the data and its subsequent presentation in the following chapters.

This study's interview transcripts were analysed by assigning a colour to each of the six elements identified within Activity Theory. Sections of each of the interview transcripts were then highlighted in the respective colour that corresponded to the nature of the discussions. For example, discussions around Tools were highlighted in yellow and discussions around the Subject were highlighted in blue – see Appendix C for an example.

While this enabled the collation of discussions around similar topics it also highlighted discussion that were not immediately related to the investigation; these discussions were not highlighted in any colour. Many of these discussions were off-topic and unrelated to the investigation, however, an emergent element, which is not a discreet element within Activity Theory, was identified by this method.

The analysis is presented in three chapters, each chapter relating to one of the three KTPs investigated in this study. The chapters are divided into six sections that pertain to the specific elements identified by Activity Theory. The elements of Subject, Object, Tool, Rules, Community, and Division of Labour are presented and discussed in turn. Following this in each chapter is a section that discusses an 'emergent element' that is not currently identified within the Activity Theory framework. Discussions and data pertaining to each element are presented in chronological order. This is done in recognition of the significance that Activity Theory places on the development of tensions between elements over time and as a meaningful way of portraying qualitative data and analysis (Becker, 1958).

4.2.5 Research Challenges

This section reflects upon the issues faced during the PAR study, data capture, interview transcription and data analysis.

As a Senior Lecturer engaged in supervising KTPs, adopting a PAR approach for the study of knowledge acquisition was advantageous. The mechanism of undertaking a KTP requires the involvement of an Academic Supervisor and thus access to the organisations was not found to be problematic. In all instances the organisations readily agreed to the KTP being used as a context for undertaking research: each organisation requested anonymity in this thesis and any subsequent publications. Future research that aims to undertake independent research into KTPs, that is, by individuals or organisations not directly involved in their undertaking, may find access less easy to obtain.

Compiling field notes was also not problematic and aided in overcoming some of the problems of data capture during PO research noted by Vinten (1994). During the on-site visits and formal meetings, notes could be made of pertinent points as they arose, for example, changes to the KTP objectives that were discussed during management meetings. Examples of the instantaneously sampled field notes are provided in Appendix B. The field notes have not been rewritten or typed and were not compiled according to any preconceived form or structure, as the term ‘instantaneously’ would imply, although their content is based upon the elements of Activity Theory and tensions that mediate the process of knowledge acquisition. Accordingly they may lack legibility and structure that would facilitate further independent analysis of their content. Future studies that employ this approach may consider compiling field notes using an audio recorder – although this may not be possible during formal meetings for example – and the transcription of notes in a manner similar to that employed with interview recordings.

The semi-structured interviews were not inherently difficult to conduct; the researcher had previous experience of undertaking such interviews. Scheduling interviews was sometimes difficult due to the length of time that they lasted: during times of significant change in the KTP, when the

factors that mediate knowledge acquisition were arguably most prominent, the Associate was usually most actively engaged in the project and therefore had less time available to take part in interviews. On these occasions instantaneously-sampled field notes were helpful in capturing events 'in the moment', and the KTP Associates were most agreeable in taking-part in interviews outside normal working hours.

Interview transcription and data analysis were found to be most onerous, agreeing with Miles (1979) observations. The use of a digital audio recorder enabled the rapid transfer, duplication and backup of recordings. Digital recordings could be played, paused and rewound during transcription using software available on personal computers and was found to be clearer to understand, and easier to operate than tape-based recording devices. The decision was taken to undertake the transcription process oneself rather than subcontracting the work. This was done in order to review the large volumes of data gathered during lengthy interviews, to ensure that technical terms were transcribed correctly and to record pauses, laughter and other utterances (see section 4.2.3). Furthermore, transcription of the interview recordings often suggested new lines of enquiry and the formulation of questions for the next round of interviews, in accordance with the process of cyclic data capture and analysis adopted in this study (Bositis, 1988; Miles, 1979; Sanday, 1979; Becker, 1958). Using colour-coding to identify themes within the interview transcripts was extremely useful, being quick to complete using the 'highlight' function in Microsoft Word, and enabling the rapid identification of common themes. Furthermore, this approach initially indicated the emergence of new themes of discussion that prompted the cyclic development of further interview questions.

4.3 Ethics

Ethics involves taking such measures that are necessary to protect the "*interests and concerns*" of those that are involved in the research process (Robson, 2002, p18). This section outlines the efforts that have been taken in this study to protect the individuals and organisations upon which it is based.

The specific aspects of this study's ethical considerations are drawn from the University of the West of England's (UWE) research ethics policy and procedures, where this thesis was prepared.

4.3.1 Overview

As stated in Chapter 1, one of the intended benefits of KTPs is for the partnering academic institution to gain the opportunity to conduct valuable, real-world research (KTPe, 2012).

Some institutions specifically note the need to gain ethical approval for any research, or knowledge exchange activity, prior to that work taking place, for example:

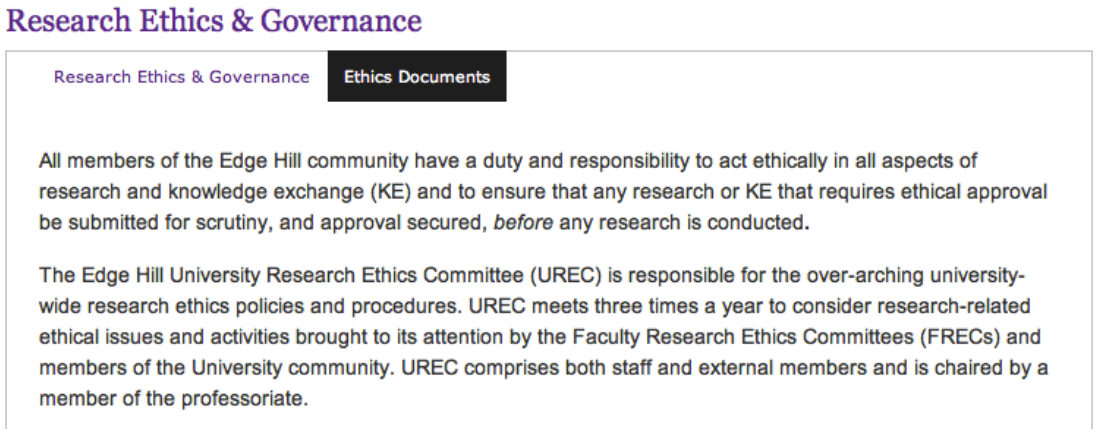

Fig 4.1, University Research and Knowledge Exchange Ethics

Source: http://www.edgehill.ac.uk/research/research-ethics-governance/

At the time of writing the University of the West of England did not specifically mention the need for knowledge exchange activities to gain ethical approval, although any research undertaken within their framework would require approval under the university's research ethics policy: available at:
http://rbi.uwe.ac.uk/internet/Research/ethics/default.asp

4.3.2 Informed Consent

This is defined by UWE as:

Informed consent is an ethical requirement of the research process. Potential research participants should be given sufficient information about a study, in a format they understand, to enable them to exercise

their right to make an informed decision whether or not to participate in a research study. Available at: http://rbi.uwe.ac.uk/internet/Research/ethics/FAQs.asp#informed

At the beginning of each KTP, the researcher disclosed the intention to undertake independent research alongside the project supervision. This was discussed with both the KTP Associate and the Industrial Supervisor and consent was gained (Babbie, 2009).

Since one of the objectives of KTPs is to generate and disseminate research, this thesis has resulted in the publication of several articles, outlining preliminary findings and other observations. In all cases, to ensure that the requirements of all research participants were maintained, the Industrial Supervisor was requested to proof read and approve all outputs prior to submission for publication.

4.3.3 Anonymity

It is necessary to ensure participant confidentiality both to encourage frank and honest discussion and to protect them from being identified (Babbie, 2009). In this study it was necessary to protect, as far as possible, the identity of the KTP Associates, the host organisations and any other individuals that were discussed during the course of the Participatory Action Research and interviews.

Throughout this thesis the names of all KTP Associates have been removed, the names of participating organisations have been changed, and any other individuals have been referred to as ‘Person A, B or C’ etc.

4.3.4 Record Retention

The requirements of various research funding bodies are listed by UWE. Available at: http://imp.uwe.ac.uk/imp_public/displayentry.asp?URN=5669&rp=listEntry.asp&pid=11.

However, no specific requirements of the funding body of the KTPs used in this study (the Technology Strategy Board) are identified.

UWE does provide guidance on the method of disposal of research data that is in line with the Data Protection Act (1998):

Personal and individual case data should only be held for as long as is necessary for research purposes. When it is no longer needed it should be physically disposed of in a secure manner. The Data Protection Act, however, allows personal data to be retained for specifically defined research purposes. Available at: http://rbi.uwe.ac.uk/internet/Research/ethics/FAQs.asp#dispose

In accordance with these guidelines, the data captured for this study shall be held for no longer than is necessary in order to complete this thesis.

Research data has been generated through this study in three forms: hand-written field notes, electronic interview recordings, and typed interview transcripts. Electronic interview recordings and typed interview transcripts are stored on the UWE staff intranet and are subject to the university's information system backup and protection practices. Data is also stored by the researcher on their personal electronic information system and by their supervisory team (the Director of Studies and Second Supervisor). Upon successful completion of this thesis the electronic records held by the researcher shall be erased, and the supervisory team shall also be requested to erase any data. Hand-written field notes shall be physically destroyed after successful completion of this thesis.

4.4 Summary of Methodology

This chapter has outlined the philosophical approach adopted in this thesis to explore the factors that mediate knowledge acquisition through the performance of Process Mapping in Knowledge Transfer Partnerships that deliver business process improvements. It also detailed the research strategy and data capture instruments along with the approach to data analysis and presentation. The study adopts a Participatory Action Research (PAR) strategy, employing multi-site triangulation and cyclic data capture and analysis over an extended period of time, detailed in section 4.1.5.

Participatory Action Research was chosen as the research strategy to utilise the researcher's role as Academic Supervisor and immersion in the three organisations conducting Knowledge Transfer Partnerships. The literature identifies multi-site study as means of improving the reliability and validity of interpretive enquiry (Eden and Huxham, 1996; Miles, 1979). The literature also recognises that adopting a cyclic approach to data capture and analysis improves the quality of interpretive enquiry (Bositis, 1988; Miles, 1979; Sanday, 1979; Becker, 1958).

The ethical considerations of this study have been discussed as have the challenges encountered during the data capture and analysis phases.

5.0 Analysis of Rural KTP

This chapter presents the analysis of the data captured through interviews with the Associates of the Rural Knowledge Transfer Partnership.

This KTP was initiated to develop and implement an environmental management system (EMS). This was required to improve the organisation's waste management systems and practices and thereby deliver bottom-line savings. It was also envisaged that the achievement of an accredited EMS would enable the society to demonstrate and market its commitment to minimising its environmental impact and enable it to support other organisations in the area to pursue the development of their EMS in the future. Ultimately the KTP gained EMAS and ISO14001 certification for the organisation and delivered significant reductions in energy costs and waste production. It also delivered improvements in online ticket sales systems and finance information systems.

The appearance of an emergent element is identified and discussed (section 5.7). This element suggests that the skills and abilities of individuals that comprise the activity system are a further source of tensions, or disturbances, that affect the performance of the Activity.

The dates that the interviews were conducted are indicated below -

Interview 1 11th May 2008	Interview 2 11th November 2008	Interview 3 12th March 2009	Interview 4 14th April 2010

Section 4.2.2 discussed the use of semi-structured interviews as the primary source of data capture, supported by instantaneously sampled field notes. It also identified other sources of data that may be utilised to provide rich insight into the KTP activities, including formal and informal meetings and discussions. In the case of the Rural KTP the Associate maintained a relatively high degree of communication with the Academic

Supervisor: frequent face-to-face discussions took place both at the premises of the Rural organisation and at the university, further correspondence took place via telephone, email and social media.

While no quantitative analysis has been made, communications appeared to increase in frequency in the approach to milestones in the project, for instance, prior to external audit of the newly implemented environmental management systems. Communications were also more frequent at the beginning to the project while detailed plans were being developed. As time progressed the frequency of communication tended to decrease.

Many of the discussions between the Academic Supervisor and the KTP Associate took place around formal documentation. This included existing and newly generated process maps, KTP progress reports, reports generated by external auditors and organisations, and other documents, such as spreadsheets, produced by the Associate. These often occurred within the semi-structured interviews and also contributed to the collation of the instantaneously-sampled field notes.

Discussions over the use of process mapping techniques tended to take place face-to-face. These often involved practical demonstrations and experiments in how to use the tool (see section 5.3). Concerns over the project goals and interpersonal relationships were often conducted face-to-face but were also conducted via social media. Negotiations around the formal arrangements of the KTP, such as training courses, budgets and holidays tended to be undertaken via email or telephone.

The discussions undertaken via email and social media, though not recorded, contributed to the identification of pertinent issues and the development of interview questions. Notably, the disturbances between the Associate and other members of the organisation's staff that became significant tensions during this project were discussed frequently via social media (see sections 5.1 and 5.5).

5.1 Subject

The Associate begins by reflecting upon a presentation that he gave to the workforce, about the work that he was undertaking in the KTP, immediately prior to the interview being conducted:

> *Umm, I think, my delivery wasn't the best but the, umm, like, the content that was discussed was, you know, it's what needed to happen, I think, so everyone is aware of, that's it, that's the way were going to do it, and if there's any, kind of, you know, what happens now it's not a shock at least.*

He has introduced two elements that become recurring themes within the subsequent discussions, comprising a critical perspective of his own actions and an awareness of his actions upon the project and workforce:

> *I've done quite a number of presentations and some of them go better than others. But with this it's my...it's mine…it's my…you know…baby as it were, you know, that I've spent the last three months, you know, working on and…*

At this point the Associate appears disappointed in his own ability particularly, as he states, because this presentation was made around a project that he has been working on for some time and for which he appears to have a deep sense of ownership – this is also apparent in further discussions.

His realisation of his ability to positively affect the outcome of the project is clearly stated:

> *I think, certain people who I feel were very reluctant to start off with, some have really, by spending time with them, have, and getting to know them, they, I've, they've been more and more forthcoming*

And, that his actions are recognised by others:

> *like for example today* [Person B] *was extremely kind of, complimentary, at the end and recognised the need for change and that I've, you know, there was definitely, you know, there's a lot of merit in what I'm doing which I was quite surprised about*

However, some people are not as convinced as others and that much of this is perceived to be due to his own inabilities and failings:

> *but there's some people that haven't, kind of, have been negative and are still negative and I think that that's down to…I mean, it's down to me really, you know, I should have spent a bit more time with them and tried to kind of get them on board a bit more, that would have helped*

When discussing the key events in the project over the previous weeks the Associate highlights his intentions to manage the project effectively, by scheduling and managing meetings for instance. However, he recognises his own failings in adhering to his own plans:

> *I had a very kind of strict agenda, and, I mean you know, an hour meeting and timings so you know it should have been an hour, for about forty five minutes of that meeting they persisted on making points, on, the same point, on, the new system and we weren't there to discuss the new system we were there to discuss what's happening you know, what trench needs to be dug tomorrow or next week. I think that was my fault as an ineffective chairman*

All of these occurrences contrive to have a powerful effect on his levels of motivation: a factor that Kim (1993) raises as significant to successful knowledge acquisition. Relatively minor tensions begin to have an increasingly negative effect:

> *it's like with the review today I know that they had a, I was getting really frustrated trying to arrange this review and yesterday I found out that I might have to change the time…umm, and, you know, I emailed* [The Chief Executive] *saying you know, that I might delay it for an hour start an hour later and I was just making little comments like, and have been for the last few phone calls 'this will happen, I really want to make this happen', and betraying my kind of frustration with it that, it just, it all seems to be kind of against this thing happening this bit of work happening.*

At this stage there is a growing tension between the Associate's need to progress the project and his need to be an effective, independent manager of that project:

> *in the SMT she said to both of them 'all senior managers, you know, what* [he's] *doing is really really good and you know he's really enthusiastic about it and can you please kind of keep his enthusiasm there' so…*
>
> *But, it's not like I went to her and went 'no one's listening to me, everyone's being and being really difficult' but she obviously picked up that that was the case and, she's aware of all these problems anyway, she knows what's going on so…for me to come across these things so, you know, she knows what the barriers that I come up against.*

Observation of the Associate's level of motivation clearly point to deep frustrations at the slow progress being made and a desire to inform the project stakeholders that the inactivity is not due to his personal failings. Contrastingly, he is reluctant to highlight this officially since he perceives this as his own inability to manage the project effectively.

Over time, the Associate becomes less self-critical as his understanding of the organisation's history and 'way of working' becomes more apparent. Although he still maintains critically self-reflective he appears more able to weigh his limitations against the organisational environment and history:

> *Umm, I've gotta say I was, err, all kind of really 'go get em' very positive three months ago and now it's kind of like* [phew/sigh] *kind of, 'is this ever gonna happen' you know this, it kinda grinds you down a bit. All these kind of comments, these little comments…and I find it frustrating for myself, I pick up on other people's frustrations with things like that…it frustrates me just as much that things are not progressing as much.*
>
> *Umm, I think, the, that sometimes the history of an organisation and like you know the kinda context of this current situation, I don't know when someone last looked at this you know change to the process, as far as I know it hasn't ever changed. I get the impression. Its not really been reviewed its just kind, of organically, kind of…I wont say evolved coz it hasn't really changed that much but you know what I mean its…*

Increasingly the Associate identifies the role of other employees in the organisation and how their own actions and motivations affect his ability to progress the project work. This tension between Subject and Community is highly significant and is discussed in Section 5.5:

> *There's no written documentation to say what happens, it's all, it's all in peoples' heads, and sometimes they can be quite reluctant to kind of, I think it gives them a kind of power if they've got this kind of information, and not to, and that's something I've found throughout* [the organisation] *not just with this* [cannot decipher word] *order process…knowledge is power and if people have got knowledge and information and don't, you know allow access then, you know don't allow other people to have this knowledge it makes them important.*

His realisation that other employees have a different, but potentially valid, perception of him and his project gradually begins to appear:

> *Umm, I think a lot of people wonder what I'm doing, what I'm here for and especially in the first kind of few weeks I did get kind of a few comments,*

He relates other's comments when he had explained to them the purpose of his being there:

> *They laugh and go, you know,* [the Associate jokes] *'good luck'.*
>
> *That didn't happen too often but, like 'ok'.*

Once again his self-criticism rises to the surface and he reflects upon his introduction to the organisation as being something that he was responsible for and could have conducted better:

> *Yeah, I think again it's something that I could have managed a bit better I think kind of, my introduction and maybe could have, you know, set up a, you know, a ten minute presentation on who I am and what I was about or you know, could have done something. But I don't know maybe it's that kind of mystique, 'there's someone doing something'.*

This is a most important observation since this Associate's involvement with the organisation is the third in a series of similar projects. The Associate was fully aware of these previous projects. The comments that he had received regarding his purpose, including 'good luck', are perhaps indicative of the success rate of the previous projects. While significant benefits had been realised by each project, the key stakeholders were aware of the difficulties that previous Associate's had encountered in terms of establishing effective working relationships with other employees. Most interestingly, the current Associate mentions one factor that had been mentioned by other Associates:

> *Maybe it's, they…maybe it's threatening for a university educated, person to come in and, analyse their…*

One of the key reasons for undertaking these projects was to introduce modern business management techniques and expectations into the organisation since the majority of the workforce had no management education. In fact, a significant number had little experience of working in any other organisation. It is therefore likely that tensions arise between Associates and employees due to their perceived stereotypical differences and purposes. Observation does not reveal further evidence of such a divide, although it must be acknowledged that it may be extremely difficult to detect any such prejudices in practice.

Over the duration of the project the Associate's desire to succeed surfaces during discussions, but embedded within these statements are critical self-reflections:

> *I've got a real passion and commitment to make sure that you know that this will happen, I might not be the most kind of, I might not communicate it but you know I, the administrator gets here at eight o'clock so I'm*

usually here at eight o'clock, ten, quarter past eight, and, I don't know whether that kind of comes across but, and then he's here early but I just, for me, I can't, do something you know that I'm not, I don't care about, and I do care about how we want this to work.

Eventually the Associate begins to realise that he is highly critical of himself:

I don't think I'm doing it too well but then I've said that all the long, I'm quite kind of self-critical

It is notable that this changing perspective is accompanied by a significant change in the Associate's motivation and attitude toward the project. While it does not signify a considerable increase in motivation it does signify a reduction in the level of frustration and demotivation:

if people don't want it to succeed there's only so much I can do, to make it succeed do you know what I mean. If people don't want it to happen I'm sure they'll find a way, I don't know.

This could be interpreted as apathy or resignation to let events unfold without intervention, but, the Associate now begins to make bold statements about his intentions:

I will now have a clearer picture of how that, will now, be you know applied you know, you would have had a plan but it wouldn't bear any resemblance to reality

months I'm going to be looking at environmental issues energy conservation etc, you know, and try to communicate that now, so that people are aware that I am here that I do know what I'm doing and, what bits that are, if we're not going to do stuff now but there will be,

I'm gonna state my intentment.

This is a pivotal moment in the project. As previously stated, prior projects had failed or terminated due to Associates becoming frustrated at lack of progress. However, this Associate appears to have overcome the feeling of personal failure and begins to approach the project more objectively and dispassionately:

might be worth having a, all staff kind of session, just detail my, activities for the next for the remainder of the project particularly with the emails and, and then say you know, start off with that and just, 'this is what I'm doing, this is what is likely to impact on you'

Observation indicates the project plan becoming rapidly more detailed at this stage, and the more detailed the plan, the more confident the

Associate appears in communicating and preparing to undertake the project tasks.

This is accompanied by a radical transformation in the Associate's level of motivation. From being resigned and possibly disinterested, he begins to enthuse about the project:

> *It's massively interesting and you know, if I can achieve what we're setting out to, I think it'll be brilliant*
>
> *my whole driver is that hopefully again I can say 'I did that', and you know, that was my, that was my little bit...my contribution.*

In order to ensure that these statements were not made to gain the confidence and support of the interviewer (the Academic Supervisor and a project stakeholder) the Associate was asked how valuable these achievements would be as "*a page on the CV*". He responded in a manner that appear genuine, surprised that he had not thought of the work as merely being an addition to his CV:

> *You know, it is a massive opportunity for me but then I was thinking the other day well I don't have to work this out I don't have to do this I could just kind of potter along for eighteen months, lie at interviews make some stuff up about what I've done here, use my training budget very selfishly get a twenty-five, thirty, thirty five thousand pound job at the end of it and not really care about whether I've changed anything or whether I've made anything any better', but, that's not me* [Associate Laughs].
>
> *I wish it sometimes it would be easier if I could look at it like that but at the end of the day that's not me I would want to be doing the best job that I could do.*

It is interesting to note that the Associate becomes increasingly motivated as the project progresses. Although he still encounters obstacles and feels frustration at other employees being unwilling to inform him of errors and omissions in the process maps, he no longer appears demotivated by these minor disruptions.

Contrary to previous discussions the Associate believes that, as the project moves into this more detailed phase, it is more important for him to formally communicate his purpose to the rest of the workforce. He states that it was less important to do this at the start of the project, however, this contradicts the analysis of his relations with other employees in (Section 5.5). It would appear that his insistence upon this

phase being more important is due to the increasing detail of the project plans. Observation reveals his growing confidence with the increasingly detailed plans and this would support the conclusion that the Associate is observing the initiation of the project as relatively unimportant. Furthermore, it is only at this stage that he appears to have the confidence and relevant information to be able to say to the workforce:

> *...this is me this is what I've done this is what I'm here to do*

The Associate also appears more able to deal objectively with the overall nature of the organisation within which he is working. Whereas seemingly minor tensions would have resulted in deep frustrations, he now relates the difficulties that he encounters with less emotion. When asked directly if he still feels motivated he states:

> *...today I'm not because it's the first day back from a few days holiday* [Associate Laughs].
>
> *Umm, I don't know I still want, I still want it to work it's just, it just gets quite, it's quite a big undertaking anyway in any organisation and you've got the specialties of* [the organisation] *to contend with.*

When asked to explain 'specialties':

> *Well the, the treacle factor ...just everything taking so long just to you know even doing relatively straightforward things and you think you've agreed it and, you have another meeting about it a month later just discussing the same thing and it's like we've had this meeting we've had this discussion what are we still talking about it for, why hasn't anything happened.*

He maintains his self-critical perspective for failings in the project but begins to add discussions of ways in which the problem is also owned by the organisation:

> *Well if you say that it's my project then you could say that I was responsible but from a general, working, practice is that you should have meetings it's minuted even action-pointed at least then you know what the outcomes were and, but…it's a structural thing.*
>
> *Well obviously well it's steeped in history and that's…this structure is a result of times gone, gone by, and the people that are still there after all this time you know.*
>
> *It's been about adapting the organisation around the individuals and not the, individuals around the organisation.*
>
> *With any other organisation you'd, change the individual*

It's the [Associate names the organisation] *and it operates in its own kind of, universe. It's out of sync with the rest of the, rest of the world.*

In stark contrast to the Associate's initial difficult relationships with employees, he begins to draw a great deal of motivation from the small but positive comments that they make:

I was a bit more direct and she said well that wouldn't work in this instance…I wouldn't have got to where I've got to if I'd just had gone in and gone 'right…this is rubbish you shouldn't do it that way you should do it this way'. It was nice that it kind of that it, you know confirms that I did do it the right the right way.

This reinforcement of his 'softly softly' approach however, does not divert his growing focus upon the needs of the project, that he is 'here to do a job':

I don't think there's any need and need in being aggressive about it.

…but whereas this, you know if it's in the system then I've got to do it.

Once again he draws attention to the differences between this and the earlier stages of the project:

this is more prescribed and you've gotta do X Y and Z whereas there was quite a loose, definition on the booking system

it was frustrating 6 months ago, still am frustrated with things but things are maybe starting to happen.

As previously iterated, this phase of the project is the essence of the knowledge transfer partnership and, as such, is the phase of the project upon which the partnership's success or failure will be judged. This signifies an important juncture, where the Associate's confidence in his ability is increasing and he is beginning to receive some positive feedback from the organisation's employees. At the same time there is increasing pressure to achieve the project deliverables. The Associate remains frustrated but not demotivated as was experienced earlier, instead he sees his role as less personally responsible and more of being informative:

one of the real big frustrations is that I can see a lot of things going on there and a lot of things that, lot of situations and problems and I've got, I don't know everything but I don't pretend, to know everything but I've got ideas where I think things could be sorted out and could be made, you know could be resolved be made better could be improved, but I don't have the, all I can do is suggest it, and, that's the end of it

The Associate's increasing confidence and command of the project is evident when he begins to criticise the actions of his superiors, actions that inhibit his ability to progress the project:

> *One of the real big frustrations is that I can see a lot of things going on there and a lot of things that, lot of situations and problems and I've got, I don't know everything but I don't pretend, to know everything but I've got ideas where I think things could be sorted out and could be made, you know could be resolved be made better could be improved, but I don't have the, all I can do is suggest it, and, that's the end of it,*
>
> *I wanted to just to go "shuttup"* [laughs]

However, these are not petty statements as he still recognises authority:

> *I don't wanna undermine her by going 'shuttup'.*

He also exercises his new-found confidence and command of the project by keeping future project meetings on track:

> *I'd lost control of the meetings with that so the third one the one this week I regained control a bit because I said ten o'clock we started at ten o'clock and I got through what I needed to get through and there were little kind of, you know oddballs thrown in the mix by* [The Chief Executive] *and other people but I very quickly manage to get it back onto what we're talking about*

It is pertinent to note that the Associate gained employment with the partnering organisation following completion of the KTP.

5.2 Object

The Associate began the project by continuing some of the work of the previous Associate that took part in an earlier KTP. This had the benefit of continuing the valuable work, plus, providing a platform for him to become acquainted with the organisation's working practices and people. Some basic maps of the existing process had been created by the previous Associate but were not considered adequate:

> *...their process map was very simplistic and it was basically how, a system, a computer system should work not a business process*

Despite their apparent inadequacies they were used as a starting point from which the Associate began to map the wider business processes:

> *I started with that and then, I basically kind of...started from a high level, the very, you know, fundamental, big, processes, and then started to just*

put more detail on there, break those down into sub-processes, and, kind of, grow from there really

At this point, the ultimate goal of developing an accredited environmental management system had not been finalised. Despite this, it was recognised that mapping the basic business processes was a valuable task for several reasons. Firstly, it provided a useful starting point for the current Associate, also mapping the processes would reveal opportunities for immediate business improvement. Finally, any formally accredited management system would likely require the core business processes to be documented and the resultant process maps could be used for this purpose.

At the beginning of the project the Associate was therefore aware of short term goals of process mapping and the longer term goal of developing an accredited environmental management system. It could be construed that the lack of a definitive plan at the beginning of the project contributed greatly to the tensions that the Associate experienced. However, the Associate in fact recognises the importance of having a degree of flexibility within the project plan:

I think it is useful to start off with to have, bear in mind this is the third attempt at this project, to have kind of a loose you know, because the project plan was written five years ago it's obviously not applicable now

He in fact highlights the importance of allowing him to develop the longer term project plan in light of his initial investigations of the organisation:

...it's been worth spending time kind of looking at that and how best to go forward with that, they're not just saying, EMS from, month three to month twelve because, I will now have a clearer picture of how that, will now, be

As the project moves toward the ultimate goal of developing and implementing an accredited environmental management system the process mapping activity remains important and useful. For example, management of contractors is a key aspect of environmental management and process mapping was used to understand the current processes and make improvements:

...contractor management you know, having a, you know, a process you know with how we select contractors you know and briefing kind of

induction type, you know so they're aware of the environmental aspects of the site

Interestingly, the Associate points out an important change in the nature of the overall project at this time. Whereas the initial efforts to map a variety of business processes in order to make immediate improvements was frustrating when information could not be extracted from other employees, it was not vital toward the success of the overall project. Consequently, he did not pursue matters as aggressively as he could:

...it wasn't the vital bit of the process, so, it wasn't really worth pursuing...for the sake of you know, longer term kind of relations

However, now that the project is focusing more closely on the development of the environmental management system, extracting information from people is of paramount importance:

Yeah this is more prescribed and you've gotta do X Y and Z, and there's no kind of getting around that

Toward the end of the project, as the environmental management system begins to take shape, the Associate has relinquished responsibility for the minor systems that he has previously implemented or developed: day to day responsibility for these has moved to other employees.

Interestingly, the Associate still has some involvement, apparently due to his better working relationships with the employees:

I don't have any formal involvement but that doesn't mean people don't talk to me about it and don't ask me questions about it...because I'm more approachable than [that person] *who is now dealing with it.*

Despite the more formal requirements of the environmental management system, the Associate is endeavouring to make the management system as flexible and simple as possible:

I don't want to make it too complex I don't want to make it this onerous task

In particular he draws attention to the requirements for a 'training plan':

[I have been] *trying to amalgamate these different functions into this one, one sheet to just try and keep it manageable*

I could go and do that [simply follow the requirements] *but it's the key bit that's the issue but it's not in the project's long-term best interest for me to do that.*

5.3 Tool

Initial discussions took place shortly after the KTP was initiated and some work had already been completed. The opening questions centre upon the Associate's use of the process mapping technique. The Associate relates his efforts to understand the current management systems within the organisation by mapping the processes:

> *Umm, well I suppose…sort of…you know, trying to map how we do things, how we do things currently…umm…kind of, sitting down, having some meetings, but more informally, just sitting down with people, the various different people involved with the process and then, you know, seeing what their bit, how, you know, how they deal, you know, with the bits that they have to deal with, and then looking overall at how that links with other departments, and getting a view on that, and then, yeah just going round, you know, everyone involved really.*

It is clear that while some formal approach is taken, in the form of 'meetings', a large proportion of process mapping takes place informally 'just sitting down with people'.

Observation reveals that formal meetings were arranged at the beginning of the task. These sessions were arranged to formally introduce the Associate to a department and its manager or staff and to identify any specific objectives for the particular department. Often, the department manager would highlight ongoing problems that they requested be addressed by the Associate in the course of mapping the department's processes. At other times the Chief Executive would have strategic objectives that the Associate would be requested to investigate or address during the process mapping.

The Associate also identifies differences in the ways in which the process maps were generated and recorded:

> *Umm…wh…there's two ways. One, sit down with people and just have a general discussion about the process, and then, that would either, I would then go away and produce a process map or I would sit down and go, run through, specifically step by step the process and then map it. Then, once I had the initial process maps I would go and review those with the people to make sure that I've got it right and everyone's, you know, and also, revisiting it sometimes 'oh, I didn't tell you about that', and, that kind of thing, so, those meetings, you know, very formal. But then some of the things came out about the processes from just one, from just spending time with people, like, I, I, with the Trading Company General Manager,*

> *umm, she does, umm, like, reads* [cannot decipher phrase] *and meets clients on the first day setting up making sure you know, they've not put a trade stand in front of a fire door, and just going round with her generally there's a lot of things that, well kind of like, 'oh and this is, I forgot to say about this, you know, I have to check, this and that, so'.*

Some process maps are generated in conjunction with other employees: those that are responsible for the process or that regularly undertake that activity. Occasionally the process maps are created in conjunction with the employee; both persons constructing the map in real-time, as the process is undertaken. At other times the process maps are generated in note form, or at a low level of detail.

Although the Associate does not raise this as a significant tension, observation reveals that process maps that are generated at a later date, are done so without the employee's participation and are done so for two reasons: firstly, the process is lengthy or complex, or, secondly, the assisting employee is unable to dedicate the necessary time to aid in their generation. These are unsurprising reasons since the employees' knowledge of entire processes outside their immediate control is often limited and also because the worsening economic climate had resulted in redundancies and these had subsequently increased the workload of many staff.

The Associate does raise the issue that some of the important elements of the process maps only become apparent after he has been 'spending time with people'. Once again the Associate does not highlight the severity of this tension even though he does expand upon the problem:

> *The familiarity, they, they're very familiar with this process, they, you know, for instance* [she's] *been here for twenty eight years, twenty years in her current role so, it's what she always does, and it almost seems insignificant really, it's not really important, just, it's… it's not unimportant it's…it's…inconsequential really, it's like kind of, that's it.*
>
> *Umm, I mean just going back to something I was telling you earlier on is the umm, that people don't realise that things are important or are part of a process. It's, you know, just these little things that are not really important.*

This is a significant tension since the ability to generate complete and accurate process maps is therefore reliant upon an employee who is not

directly responsible for the generation of the process maps. This has been noted by Keller and Jacka (1999) who found it imperative to utilise the input of process owners in the construction of process maps.

Observation reveals that the process maps that were generated by the Associate were accurate enough to enable the project to be successfully completed: this is not to say that they were entirely error-free. Much of the detail of the more complex process maps was gained through an iterative process of process map generation and revision, aided by the involvement of the employee and also by the increased exposure to the process that the Associate gained by spending considerable time with that employee when undertaking the process in question.

The Associate relates how the finer details of the processes become apparent after spending time with the people and processes:

> *Umm…I think, yeah, there's more details and there's, there's, maybe other aspects to the process that didn't, you know, wasn't, you know apparent initially.*
>
> *I think, I think a lot of things come out of just general discussion, when you talk about a process umm, they'll, they'll mention a particular document as if and just kind of go over it whereas, the more you discuss it and you go 'what's, you mention that document, what is that' you know, and…yeah.*

Blackler (1995) highlighted the significance of the form that the activity takes and its effect upon the subsequent knowledge that is gained. In this case, the activity of process mapping has been adapted to suit the constraints of the given business situation. While it is not possible to determine how the nature of the acquired knowledge may have changed by adapting the method, it can be seen that the quality of the resultant maps is reduced when they are generated in isolation from the people that perform the business process.

It can be concluded that the activity of process mapping therefore needs to be conducted first hand, through collaborative generation, however, the limitations of employee availability caused by everyday business pressures can prevent such a recommendation being practicably achievable.

Contrastingly, it can be concluded that process mapping requires a significant investment in terms of employee and Associate collaboration over time in order to be successful. In this case the Associate proffers a description of his own process mapping methodology that resulted in the generation of the process maps that lead to successful completion of this project:

> *Umm, initially I was very deliberate about umm, I, I had post-it notes and I said 'right take me through the booking process', coz at that stage I didn't really have a clue so, initially it was very, kind of deliberate, but as we went through, I found more stuff coming out, you know, just generally, you know, discussing it. It needed to be deliberate at first coz , you know, but when, when you've got a certain level then you just kind of, you know, if you discuss it enough all these things will come out, all the detail will fall out*

The initial stages of process mapping are undertaken collaboratively, often while observation the process being undertaken. At this stage the major elements of the process are captured and the Associate gains a broad understanding of the process. After this, the Associate enters a phase of experiential knowledge-acquisition where their own observations add detail and accuracy to the process maps, and, in conjunction with the employee, previously forgotten or unknown details of the process become apparent and can be incorporated into the process map.

The Associate raises the issue of employee willingness to participate as a significant tension that inhibits his ability to generate accurate process maps, and this is an issue that is discussed further under the element of Community:

> *I think, certain people who I feel were very reluctant to start off with, some have really, by spending time with them, have, and getting to know them, they, I've, they've been more and more forthcoming like for example today* [she] *was extremely kind of, complimentary, at the end and recognised the need for change and that I've, you know, there was definitely, you know, there's a lot of merit in what I'm doing which I was quite surprised about coz…you know, you just get this impression that she doesn't want to change whereas today she said that she wants to change, you know, and needs to change. I think that's quite a big kind of change but there's some people that haven't, kind of, have been negative and are still negative and I think that that's down to…I mean, it's down to me really, you know, I should have spent a bit more time with them and tried to kind of get them on board a bit more, that would have helped*

but…there's one particular person that I felt very, hard to approach, and, very kind of dismissive and, he's and he still maintains to be dismissive in this process.

While the project was ultimately successful, even at the earliest stages of the project the Associate commented upon the value of taking a process mapping approach, and again comments upon the necessity to have an asymmetrical approach to its application:

Umm, I think it's something, especially with this type of work, it's something that's essential, I think you have to, it's something you have to do, umm, I think it's, you've gotta be kinda strategic I think you know I started off with this very simplistic system process map and as it's developed it's developed into quite a, it's an incredibly complex process and you can't map every single step in this process because you'd have the whole wall covered in different boxes but I think you've definitely gotta break it down to have like an overview of all you know, kinda compartmentalise the particular processes, as, you know, you've still gotta show the links but, you've gotta have an overview of all the you know, the key…you have the processes.

As time progresses the mechanistic use of process mapping in order to gain understanding of the business processes gives way to a more detailed account of the technique being used to achieve the aims of the project: to develop and obtain certification for an environmental management system:

Umm I think with the EMS there's a prescribed, not prescribed way as such but, with the Acorn scheme there is, you know, these 10 criteria that you need to hit for phase one and the way the standard's written it says that that's an output and that's, you know that's documentation you know, so, I'm kind of following that really and kind of going through that and ticking, ticking the boxes as I you know do work on them.

But it's still, it is a lot of, asking questions and, you know from that point of view where I was with the processes I was looking you know I was asking questions and going away mapping it or thinking about it, you know you know, mulling over it in my own mind and going back and asking some more questions and asking someone else, still that kind of, you know, gathering of information.

The tensions between the other key members of the team still feature strongly in discussions and are perceived by the Associate to have some negative impact upon their work:

...if we have any issues with the process means that then I've gotta get involved in trying to sort it out, even though we've said I won't be doing that but, it's kind of it's a difficult situation I've, I think I've got to have

some kind of input into…but then we need to have a review, you know and it's trying to get that sorted, this is not always the easiest.

Despite spending significant time generating the process maps, individually and in conjunction with other employees, there is still a need to revisit them and make amendments:

Yes, umm, a couple of kind of minor things as, you know I mapped a process and a system at that point in time, but of, you know but now it's it's actually in the flesh and it's working and you know there's obviously little things come out you know kind of just minor amendments but, not anything particularly sweeping or, it is a part of the process which I hadn't documented in any great detail, but with people not knowing quite what to do then I've kind of I've maybe elaborated on some some of the processes.

In this case the Associate discusses the process maps in terms of their accuracy for depicting the stages in the process that he has reengineered: the outcome of analysing the initial process maps. These maps are being used as records of the process and subsequent changes; they do not yet appear to be used as training documents, although they were later in the project. Also, they appear not to be used as at this stage of the project as general discussion documents between employees. Later in the project however, as indicated by Luck (2007), Ewenstein and Whyte (2007) and Keller and Jacka (1999) these documents do become utilised as facilitators of discussion and therefore as enablers of knowledge development, creation and transfer; or, as Boland and Tenkasi (1995) discuss, they are utilised as artefacts that enable perspective-making and perspective-taking to take place.

These changes to the maps are indicative of the problems associated with understanding and investigating business processes. On the one hand there is a resource related tension that prevents employees from contributing to the exercise because they are otherwise engaged in performing their everyday duties – a factor that Szulanski (1996) notes as a significant hurdle to knowledge acquisition (see section 2.2.1.1). On the other hand there is the issue of the difficulty that the employee encounters in trying to remember the minutiae of their everyday work. This tension can be interpreted as the difficulty in recalling and expressing the aspects of their work that they ordinarily enact without

conscious effort. Such subconscious acts or tacit skills are most difficult to externalise and this is a factor that is commonly highlighted within the knowledge management literature.

The Associate identifies ways in which these gaps or errors in the existing process maps are uncovered, and, the approaches that he has taken in order to encourage others to raise the issues:

> *Umm..I found it really really frustrating because you know I've tried to be very open and very 'if you've got any problems just send me an email let me know' and some people do take that route, umm but a lot of people don't and there's this kind of, you know I find, I find out second hand that some, so and so has got a particular issue with it which is annoying because, you know I have personally gone out to say, you know 'at any point' you know on numerous occasions, 'just let me know' you know.*

It appears that some people and departments are more likely than others to raise issues or concerns with the activity of process mapping. These concerns most often revolve around enquiring how the proposed improved business system will work. These concerns are raised directly with the Associate:

> *It's like, discuss it with* [her] *and she says, you know,* [this person] *and* [that person] *are in very much the same place, if there's a problem they'd rather know about it and if there's a problem I'd rather know about it so that we can you know, work it out,*
>
> *whereas a couple of people have, thought no, yeah I don't know why maybe they've thought they don't want to bother me because they know I'm busy or, there's not that structure in place, they don't feel comfortable you know,*
>
> *if I've got a problem who do I go to. Do I go to my line manager or do we just have a general whinge about it in the office or do I, you know, why won't these systems…because then I can, you know I can sort it out but, well in the accounts office that they'll kind of talk about it whinge about it and then I find out from* [him], *and you know he'll be honest and he'll go…'it's rubbish you know, so and so is having this problem, it's like well, I don't know why they don't come up like, I've made myself kind of open to them.*

It is interesting to note that person A and person B, with whom the Associate works most closely, are identified as employees that raise issues directly with the Associate. Person A is, in fact, the Industrial Supervisor for this KTP and his relationship with them is discussed at length in Section 5.5.

Also of interest, and discussed in section 5.5, is his relationship with the whole Accounting Department, and it was this department that was the focus of the Associate's efforts at the beginning of the project. While the Associate's relationship with person B has resulted in a seemingly effective working relationship, his relationship with the Accounts Department, despite being built upon a successful project and with no known ill-feeling between individuals, has not resulted in such an effective working relationship.

Process mapping still forms a significant element of the work performed by the Associate, in order to understand the existing management systems and to provide a basis for redesign of systems that comply with the organisation's efforts to develop an Environmental Management System:

> *I haven't, I haven't quite got into in terms of process this, well I suppose it's how I said earlier on you know if we're going to have a performance indicators for environmental aspects we've gotta have a process of who does what and when…*
>
> [lengthy discussion of details of the environmental management system]
>
> *…So when I get into the you know the actual, you know the actual operating processes which is and procedures which is part of Phase 4 I think then that'll be you know I will still be doing some high-level process mapping to do with performance indicators like when a bill comes in to accounts so it's you know the Administrator inputs into data umm if whatever, there will be a need to do that.*

The Associate recognises that the approach will also be useful where there is no existing management system or process, as well as being useful for providing a basis for redesigning existing systems:

> *Yeah, you know, when it gets down to, well err some things will be new processes you know so from scratch but with the existing stuff I think it will be a case of "right so what does happen now or what should happen" and just just putting that into a framework and going "right is that the best way of doing it".*

5.4 Rules

The element 'Rules' is one that features only to a very small degree in the interviews. They are discussed more in terms of observations of the organisation's structure rather than as explicit tensions that affect the undertaking of the activity of process mapping:

I don't know when someone last looked at this you know change to the process, as far as I know it hasn't ever changed

One of the things is there's no process maps, there's no procedures, there's no written procedures for this process. There's no written documentation to say what happens, it's all, it's all in peoples' heads

The lack of formalisation of rules and ways of working could be construed as a factor that has, over time, led to the organisation being in its current situation: lacking modern management practices. This is one of the reasons why this particular project was initiated.

The activity of process mapping is in fact be one way in which organisational rules become formalised and recorded:

...when they shut the water off in the winter, you know a lot of the processes exist there but they're not documented and things are missed off, you know what I mean or it's not as efficient as it could be

...some things will be new processes you know so from scratch but with the existing stuff I think it will be a case of "right so what does happen now or what should happen" and just just putting that into a framework and going "right is that the best way of doing it".

Although this particular tension is not deleterious to the activity of process mapping it must be noted that lack of formal working practices continues to have a negative effect on the daily operation of the organisation. While processes are changed and improved, without new ways of working being reinforced, the organisation fails to maintain the improved practices, and the Associate observes this:

...this week there has been a bit of a breakdown again
...going back to…old ways.

'Rules' are also discussed when the project matures to the phase of developing and implementing the environmental management system. However, once again the tensions that are identified do not directly impact the undertaking of the process mapping activity. Rather, they are tensions which the correct undertaking of process maps may be able to reduce or even eliminate:

...the standard's prescriptive to a point, there's documentation for example on managing contractors but it doesn't specify what format that documentation

I'd rather go down the more you know try and get it as, keep it workable but still keep it very formal

The Associate has identified the requirements of the environmental management system and governing standard, and noticed that there are no formal detailed requirements in many areas. This has enabled him to develop systems that are appropriate for this organisation.

5.5 Community

A significant tension appears to be that between the Associate and many individuals within the organisation. While the Associate reports that much of the detail of the processes that he is mapping comes from casual, if not informal discussion with other employees, he also identifies the lack of co-operation from individuals as being a significant inhibitor to his ability to undertake his work:

> *...a lot of things come out of just general discussion, when you talk about a process umm, they'll, they'll mention a particular document as if and just kind of go over it*
>
> *...just going back to something I was telling you earlier on is the umm, that people don't realise that things are important or are part of a process*

Over time however this becomes less of a problem as the Associate's relationship with other employees changes:

> *...certain people who I feel were very reluctant to start off with, some have really, by spending time with them, have, and getting to know them, they, I've, they've been more and more forthcoming*

It is notable that the Associate finds some clusters of people are less inclined to be forthcoming with information than others. He offers some thoughts why this may be the case but over time it becomes clearer that individual departments can be identified that are less co-operative than others:

> [Tentatively, discussing the whole organisation's attitude towards the project] *Maybe, Maybe it's, they…maybe it's threatening for a university educated, person to come in and, analyse their*…[Conversation tails off as Associate reflects upon this statement]
>
> [Identifying a specific problematic area] *in the accounts office that they'll kind of talk about it whinge about it and then I find out*
>
> [Again talking about Accounts] *They never go direct to the problem they go kind of round the, round the houses. It's just not very productive you know*

The most significant tension though is the relationship between two specific members of the organisation. Both of these individuals are influential employees with responsibility for specific areas of the company. Some of the Associate's early work to improve the business processes and practices required the development of key processes that spanned the two departments for which these two individuals are responsible. This development work did not require significant changes to the activities in either department and did not threaten to change the relative importance of the departments or individuals: the changes involved improvements in communication and data provision that were of benefit to both departments.

At the outset, both of these individuals were reluctant to change, however, as noted above, over time these attitudes changed as the Associate's relationship with them developed. Most interestingly, the Associate was proactive in attempting to forge good working relationships with both of these people, but significantly different results were observed – the individuals are referred to as A and B to maintain anonymity.

The Associate was physically located adjacent to person A while person B worked in a different office, physically remote. The decision to locate the Associate with person A was made in light of the ultimate goal to develop an environmental management system that would require the assistance of person A. The Associate therefore had a high degree of contact with person A and, in order to develop a good relationship with person B, he actively sought contact time:

> *I made such a real conscious effort not to just email and phone to go in person to physically go and spend time with* [her] *in terms of understanding her processes and, you know, her input into the process but also like to get to know her as a person and a human being by standing outside when she's having a cigarette when I don't smoke*

Curiously, the formal location of the Associate next to person A appears to have had little if any positive effect upon their relationship, whereas the informal nature of the Associate's relationship with person B appears to have had a markedly positive effect:

> *I find it really hard to approach him and when I did have any especially being sat across the desk from* [Person A] *it's you know I could have sat there all day going 'oh, by the way, you know, by the way you know, what about this you know what I mean'*
>
> [Person B] *can see me as a person not as just me as someone being that's come to change it you know and, cause trouble well you know. I think it's made her more receptive coz she understands me as a person and that's kind of made her more open instead of someone she doesn't know or understand and have any time for, its someone that's got to know her*

The Associate points to the fact that he sits next to person A as being a problem. Being in close proximity allows him to witness practices and problems and therefore did not need to spend time extracting details of existing practices and problems from person A.

The relations between the Associate and persons A and B are seen to be markedly different when person B gradually begins to show attitudinal change toward the project as a whole:

> *...you just get this impression that* [Person B] *doesn't want to change whereas today she said that she wants to change, you know, and needs to change*
>
> [After a project presentation by the Associate] *the biggest thing for me was* [Person B] *and her comments at the end. Umm, yeah I think that's, that was brilliant you know, coz I thought she'd be the kind of staunchest critic, but she was, she was brilliant.*
>
> *...whereas,* [Person A] *when, you know, outside of meetings is quite negative but in meetings he is negative as well!*

This change of state of their relationship over time reflects the assertions made by Fernie, Green, Weller and Newcombe (2003) and Szulanski (1996) that relationships change over time. In particular, that trust is built over time that underpins effective socialisation and enables knowledge to be acquired and accepted. Yet despite the early dissonance between the Associate the other individuals he is still able to undertake useful process mapping activity and generate process maps. This is highly significant since it confirms the postulations of Fiol (1994) whom states that action may still be taken towards an organisational outcome even if such dissonance exists.

The relationship between persons A and B is not immediately observable and the Associate does not initially hint at the nature of their association.

Over time however, it appears that A and B do not enjoy a positive working relationship: it is not clear initially whether this is a long-term issue or has transpired during this project. Senior management's role becomes more important in mediating persons A and B so that it becomes:

> *...almost a parent to keep two rival siblings, apart and behave themselves.*

Further into the project person A can be seen to be more supportive of the changes and of the Associate's efforts. Whether this is strictly due to senior management intervention or is due to the Associate's continued efforts to build a personal rapport with him is not entirely clear. Observation of the working relationships however reveals a distinct change in person A's relationship with the Associate: he begins to take a deeper interest in the Associate's personal circumstances and makes appreciative comments during project meetings and during informal discussion. This would suggest that at least some proportion of the change in relationship is due to the Associate's efforts to build a positive working relationship and are less influenced by senior management intervention.

Continuing tensions between persons A and B manifest throughout the first half of the project:

> [There is a] *stand off most of the time,*

Eventually however, with the direct and sustained intervention of senior management these tensions relax to the point where:

> [Person B] *says that they've had a New Year's Resolution to get on better, and to, you know, make a bit more of an effort,*
>
> [Senior Management's] *really really crucial in managing the, almost personalities of the process.*

5.6 Division of Labour

As has been highlighted in section 5.5 the organisation's management, in fact the Chief Executive, played a necessary role in managing the day-to-day relationship between two key members of staff (previously referred to as A and B). A role that had been described as:

> *...almost a parent to keep two rival siblings, apart and behave themselves.*

The importance of rules and controls is recognised by Mukherjee et al (1998) and Fu et al (2006) as being important in enabling the process of knowledge acquisition. Kim (1993) and Alavi and Leidner (2001) also highlighting the importance of a supportive underlying culture to remove barriers to knowledge acquisition and long-term sedimentation.

The actions of the two employees was not directly inhibitive to the Associate's work but often became a hindrance. It can be seen that much of the hindrance was due to these individuals attempting to balance their daily workloads: the pressure of daily tasks was often given priority over attending meetings and workshops that were arranged by the Associate:

> [The Associate says] *I was getting really frustrated trying to arrange this review and yesterday I found out that I might have to change the time*
>
> *...it's not like I went to* [The Chief Executive] *and went 'no one's listening to me, everyone's being and being really difficult' but she obviously picked up that that was the case*
>
> [The Chief Executive] *said to them 'all senior managers, you know, what* [the Associate is] *doing is really really good and you know he's really enthusiastic about it and can you please kind of keep his enthusiasm there'*

It appears that some of the difficulties experienced between persons A and B had been due to a lack of clear responsibilities. On occasions person B had undertaken some tasks that were usually performed by person A: observation shows that this was in order to expedite a particular event rather than a challenge to B's authority:

> *...if you know you had the structures in place you wouldn't, you wouldn't have that, you wouldn't have* [Person B]*…you know, organising maintenance contractors* [Person A's usual work]

Further tensions arise during scheduled meetings. On more than one occasion the Associate has schedule meetings to discuss aspects of the environmental management system but these became hijacked and were used to discuss daily management issues:

> *...sometimes the environmental team meeting becomes* [The Chief Executive's] *meeting*

> *...half an hour had gone of the meeting before we'd even got onto anything that I needed to discuss*
>
> *I wanted to just to go "shuttup"* [laughs]

When asked why he did not tell the Chief Executive to "shuttup" he identifies the good working relationship that he has formed with the Chief Executive. Observation supports the close working relationship between them:

> [The Chief Executive] *is scary.*
>
> *I get on with* [The Chief Executive] *really well, like I've got a good, you know, like when I go and see her in her office you know, you know I have a really good rapport but in that context, I don't wanna undermine her by going 'shuttup'.*

Over time the Associate manages to regain control of the meetings. The Associate avoided confronting the Chief Executive and harming their good working relationship by continually drawing attention to the importance of the meetings in achieving the requirements of the environmental management system, the management system that the Chief Executive deemed essential for the organisation's development:

> *I'd lost control of the meetings with that so the third one, the one this week, I regained control a bit because I said ten o'clock, we started at ten o'clock and I got through what I needed to get through and there were little kind of, you know oddballs thrown in the mix by* [The Chief Executive] and *other people but I very quickly manage to get it back onto what we're talking about.*

Later in the project it became necessary to appoint representatives from each department or function to take responsibility for that area's environmental performance. Selecting suitable persons was relatively simple to do but formally appointing them to their positions took an inordinate amount of time. It could be construed that this is an inherent problem within the organisation but observation shows that this was primarily due to commercial pressures. This resulted in several episodes of restructuring and redundancies. It cannot therefore be concluded that inability to formulate organisational structure is an inherent problem with this organisation.

5.7 Emergent Element in Rural KTP

The issue of personal skills and abilities appears throughout the KTP project. Some skills issues are related to the personal skills of the Associate, the individual under study, and some are related to the skills of the individuals of other employees, individuals within the Activity Theory element of 'Community'.

At the start of the project and when asked about his initial presentation to the organisation the Associate replied:

> *Umm, its, well, it's my delivery.*
>
> *I think, my delivery wasn't the best*
>
> *I've done quite a number of presentations and some of them go better than others.*

This is a source of tension that could be attributed to the element 'Subject'. However, 'Subject' issues usually revolve around issues of motivation. While the Associate's apparent lack of 'Skills' could be interpreted as being a motivational issue, this is in fact an outcome rather than a cause: it is the lack of skills that appear to adversely affect his motivation.

The Associate notices that his personal skills are also sometimes lacking even though he had previously noted that he had been successful in courting the support of some members of staff:

> *I should have spent a bit more time with them and tried to kind of get them on board a bit more, that would have helped*

As the KTP progresses he continues to critically examine his own practices:

> *Yeah, I think again it's something that I could have managed a bit better*

Later in the project, the Associate relates the difficulties that are being caused by other employees not using the modified systems in their intended way:

> *...it's a good system and a good way of working but in practice it seems that you know they're not quite using...you know...all of it and whether that's a kind of...deliberate way of you know, I...I don't know it's you can kind of question whether it is a deliberate ply that they're deliberately not using it*

It emerges that some employees are not using the modified systems due to their inability to use information technologies:

> *He's never sent a text message, umm but he can just about use his emails and, ring people off it*
>
> *He's got to grips with his Blackberry but he's still not opening these communications on his desktop.*

These observations of the Associate's lack of skills and abilities may be attributed to his own self-critical tendencies:

> *...then I've said that all the long, I'm quite kind of self-critical*

However, the tensions caused by an apparent lack of skills and abilities were also observed in the actions of others within the organisation. This suggests that the observations are not merely due to the characteristics of the Subject but are sources of tensions throughout the activity system. This appearance of this skills-based emergent element is examined further in the analysis of the other KTPs under study in the following chapters.

5.8 Summary

The use of process mapping had been most valuable, providing a mechanism for the KTP Associate to investigate and record the organisation's current working practices. These records, in the form of process maps, were used to assist further and more detailed analysis of the business processes and were used as discussion documents between the Associate and other employees: the literature recognises the value of such diagrams in the process of knowledge transfer and production (Luck, 2007; Ewenstein and Whyte, 2007; Keller and Jacka, 1999). They were also useful to train new employees and when incorporated in the business procedures become rules that govern how the organisation works in the future.

It is notable however, that despite these formal rules being in place they did not result in a change in working practices. The embodiment of knowledge into new business systems had been insufficient to generate a long-term change in business practice. This is interpreted as a failure of the organisation to enforce the Rules of work.

The Associate recognised the value of process maps to the extent that he identifies that process mapping has become a tool that he regularly uses in his ongoing work. The success of process mapping, or the accuracy of the resultant process maps, is reliant upon the Associate's relationship with other employees to some degree. While much of the process mapping can take place through relatively distant observation, detailed analysis requires input from other employees and this is mediated by their relationship with the Associate. Interestingly, there were no significant tensions discovered between the Associate and other employees during these interactions although the completeness and accuracy of their maps did improve over time.

More significant is the relationship between other employees that contrives to hinder the Associate's work (depicted in Figure 5.1). Although the Associate is able to forge decent working relations with these individuals over time, it becomes necessary for management to intervene directly to mediate their relationship and to ensure that the project receives the necessary support from both individuals. It is notable that one of these persons is the Industrial Supervisor for this KTP.

Over the course of the project a number of factors conspired to adversely affect the Associate's motivation to undertake the work. The Associate identified that the most significant of these were their working relationships with other staff. As indicated throughout the analysis section, there appears to be great difficulty for management to sustain the changes that have been made. The Associate highlights the significant effect this had upon him.

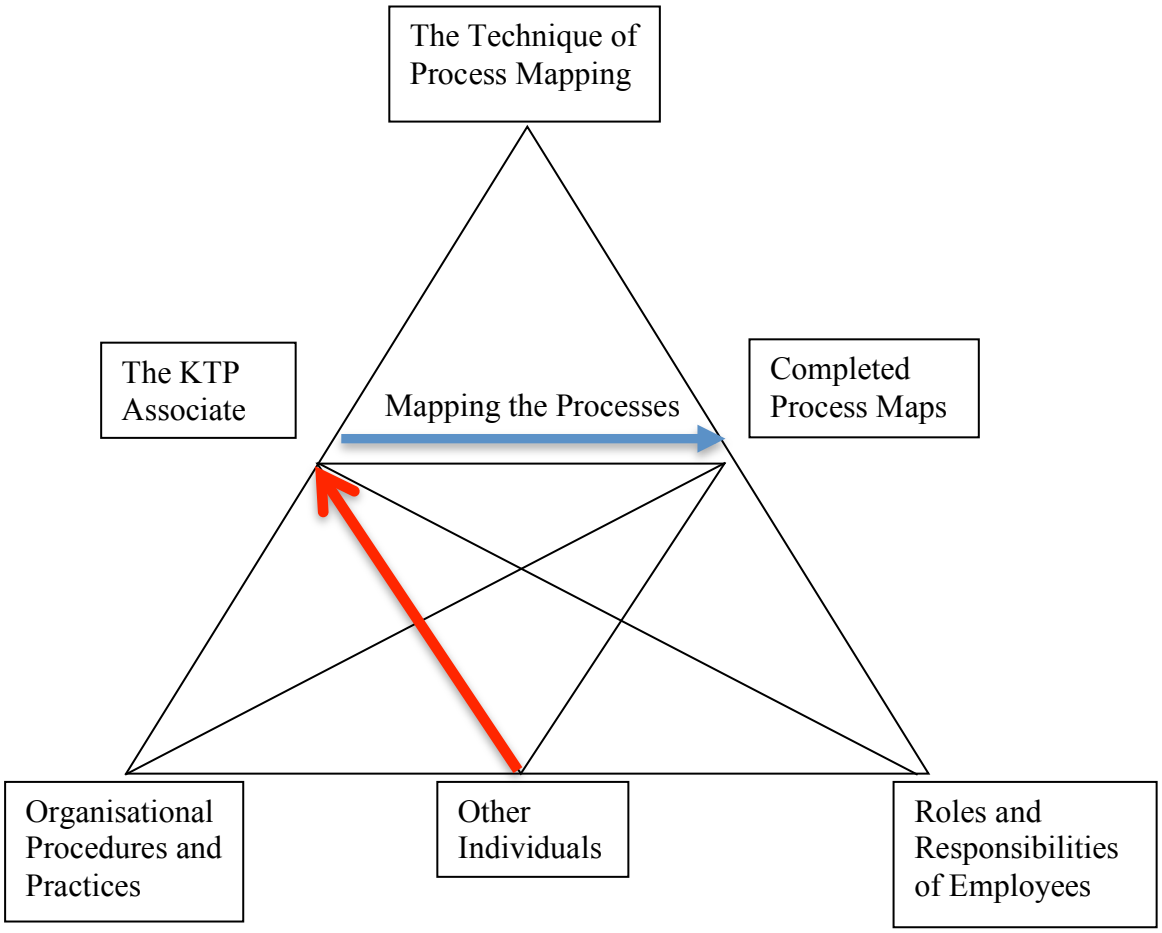

Figure 5.1 Sources of Significant Tensions in the Rural KTP

6.0 Analysis of Service KTP

This chapter presents the analysis of the data captured through interviews with the Associates of the Service Knowledge Transfer Partnerships.

This KTP was initiated to explore the organisation's existing business and information systems. Its overarching aim was to develop short-term and long-term information system strategies. In developing these, the KTP was intended to identify and implement other business system improvements. Ultimately the KTP made recommendations for the development of a sustainable information system strategy. It also delivered a wide range of business process improvements including the ordering of spares and materials, human resource management systems, and employee management and control systems.

The appearance of an emergent element is identified and discussed (section 6.7). This element suggests that the skills and abilities of individuals that comprise the activity system are a further source of tensions, or disturbances, that affect the performance of the Activity.

The dates that the interviews were conducted are indicated below -

Interview 1 14t^{h} May 2008	Interview 2 3rd July2008	Interview 3 4th August 2009	Interview 4 2nd October 2009

Section 4.2.2 discussed the use of semi-structured interviews as the primary source of data capture, supported by instantaneously sampled field notes. It also identified other sources of data that may be utilised to provide rich insight into the KTP activities, including formal and informal meetings and discussions. In the case of the Service KTP the Associate maintained a moderate degree of communication with the Academic Supervisor: face-to-face discussions took place both at the premises of the Rural organisation and at the university, further minimal correspondence took place via telephone.

While no quantitative analysis has been made, communications appeared to increase in frequency in the approach to milestones in the project, for instance, prior to the implementation of new software in the Finance and Human Resources departments. Communications were also more frequent at the beginning to the project while detailed plans were being developed. As time progressed the frequency of communication tended to decrease.

Many of the discussions between the Academic Supervisor and the KTP Associate took place around formal documentation. This included existing and newly generated process maps, KTP progress reports, reports produced by software providers and other documents, such as investigative reports, produced by the Associate. These often occurred within the semi-structured interviews and also contributed to the collation of the instantaneously-sampled field notes.

Discussions over the use of process mapping techniques tended to take place face-to-face. These often involved practical demonstrations and experiments in how to use the tool (see section 6.3).

Concerns over the project goals tended to take place at the Service organisation's premises. At these times the Associate spent considerable time introducing the Academic Supervisor to other members of staff that were involved with the planned changes or would be affected by them. In particular, the Associate initiated numerous discussions with Person C who is notable for becoming a considerable source of tensions in this KTP (see section 6.5).

6.1 Subject

The Associate begins discussions by highlighting the difficulties that he experienced in gaining access to the relevant people and departments in order to map the organisation's processes. As would be expected in a commercial organisation the pressures of everyday working life lead to meetings that are cancelled at relatively short notice. During the early stages of the project this does not appear to have any adverse effect upon the Associate's levels of motivation or enthusiasm.

Also during the early phases of the project the Associate notes the attitude of the existing employees.

> *The perception that "we are only doing research"...we are only "looking into" not "doing".*

Once again this does not appear to have any adverse effect upon his motivation to complete the project or his approach toward it. He mentions some dissatisfaction with progress during the initial phases but recognises that this is partly due to an expected period of 'settling in':

> *So you see what I mean its only really been, the last sort of few weeks where we've really been had proper stuff to get on with, sort of thing. But, I think that's fairly normal you know.*

In fact, he mentions his satisfaction with progress toward the project goals soon afterwards, and also states that the organisation appears happy with progress too:

> *I think we're doing quite well actually*
>
> *I think* [the company] *think its fine yeah.*

Interestingly, the Associate mentions changes to the project plan that took place after the project had begun. Although the overall objectives did not change, the short-term goals were modified. This had the effect of improving the Associate's perceived level of motivation since he now had a more prescriptive plan of work:

> *Because we've got a list of things we've got to get done whereas before it was like…it was too fluffy, it was open field.*
>
> *…the problem before was like, you know, I got asked to work on something and then next week I got told not to and to work on something else*

It is worthy of note that while the clarification of short-term goals was welcomed the discussion hints at the potential problems that unclear and shifting goals had: motivation is stated to be a significant factor in successful knowledge acquisition (Kim, 1993). It could be construed that, over a longer period of time, this may have had significant detrimental effect upon the Associate's motivation and therefore upon the project itself.

Later in the project he reflects upon progress to date and notes earlier problems:

> *I was saying earlier that sort of initial time when it was like all 'look at this' and then it was like 'well scrap that look at this' you know was actually err you know tying down sort of specific directions in which to work and err getting a prioritised work list together really.*

The other employees' opinion of the work that the Associate is conducting had not altered into the mid—phase of the project. The Associate still thinks that he is perceived of as someone who is 'researching' rather than 'doing', to the extent that:

> *I think they think we're the fucking Gestapo.*

The Associate immediately tempers this comment by saying:

> *I think, a lot of people are fine, I think there's a bit of a sort of a you know, a sense that, I think a lot of people think we are just sort of fannying around a bit at the moment, which I suppose we are to an extent.*

Observation supports an interpretation of these statements that concludes they are indicative of frustration at having made less progress than desired. Although work is progressing according to plan, very few tangible changes have been made: much of the work has been undertaken to analyse problems and design and develop solutions to them.

When asked if this was having an adverse effect upon him personally he replied:

> *No, I don't really care.*

Observation again supports the truth of this statement. The Associate was noticed by staff within the organisation, and staff within the supporting university, as being highly motivated and capable. He made significant improvements to the way that employees' shifts were planned and begins to show a high level of self-confidence, he also takes on day-to-day responsibilities within the organisation:

> *Umm, the guys have been messing around with shifts for like for I think about six weeks and couldn't come up with anything and then…got me involved and I did it in half a day*. [Laughs]

> *I've sort of become first-line support for all the people the Admin staff that are around the country. I'm sort of first-line support on that as well.* [Laughs]

It is pertinent to note that the Associate gained full-time employment with the partnering organisation following completion of the KTP. Despite the Associate's high levels of motivation, and growing self-confidence, he did not realise the magnitude of many of his achievements:

> *I haven't, until you came in, I hadn't actually thought of that as something we'd done really. Because it just sort of happens over time doesn't it.*

The Associate is discussing the realisation that the organisation's problems were not due to inefficiencies in the Computer Based Information System (CBIS) but were instead due to management system failures that lead to the CBIS being fed with 'bad' data. This did not result in any material improvement, which may have contributed to earlier frustrations at the slow progress, but it did result in the project refocusing on the root cause of problems and subsequently significant material changes being made.

6.2 Object

The Associate outlines the general approach toward the project in this organisation. Within this discussion he implies that there is no single goal of the project, but that part of the work is to uncover a range of sub-projects that will generate benefits for the organisation:

> *Firstly by, seeing what happens now, and how it's all done, and then, hopefully, by suggesting improvements*
>
> *Because, a company like* [this] *that makes £100 million turnover per year, probably shouldn't be done in such an informal manner as it is now…via spreadsheets and access databases…and there doesn't seem to be much…control*

He points to the formal plan for the project but highlights that the work he shall undertake may not conform to this:

> *The KTP plan says map until August but we will not take that long.*

These points are interesting since they suggest that the initial plans are inaccurate: this could lead to overall project failure or, at least, failure of the project to adhere to constraints of time, cost and quality. Observation

however, points to the fact that the initial plans are not intended to be canonical. Instead they are guidelines that are modified and finalised during the early stages of the project. In fact, the project plan rapidly acquires detail and lists of sub-projects and tasks are built up into a plan of work:

> *Yeah there's all, there's this is, basically that's the now stuff on the front page* [hands a list of project tasks to interviewer], *this is the 'Team Track' and if you look you've got umm, there's an owners column on here somewhere, there you go*

Consequently, although the Associate has been able to undertake some valuable process mapping, it is not until the detailed plan of work emerges that he is able to focus upon the critical elements of the project:

> *So you see what I mean its only really been, the last sort of few weeks where we've really been had proper stuff to get on with, sort of thing. But, I think that's fairly normal you know.*

Observation shows that the time taken to construct a detailed plan of work was hindered somewhat by exceptional commercial pressures. The loss of significant contracts had contributed to early fluctuations in the project plan:

> *you negotiate and go along with the managers over what direction to take and I'm guessing it's a knock-on effect of them being kicked in the bollocks really, they were sort of finding their feet a bit and themselves weren't quite sure what the best direction to take was, now they've all sort of decided its filtered down to us and that's how I would look at it anyway.*
>
> *The shift stuff though I think that, that is the umm the work that may have come out of this, I don't know whether they were thinking about if before and whether they just brought it forward or whether it was something that they sort of knew but with the economic downturn that's something that we pretty much did pretty quickly.*

Additionally, the assumptions upon which the original plan was made were found to be erroneous. The Associate's efforts to map the business processes identified that data quality was a pertinent issue and that the efficacy of the business information system itself was not the main problem – also discussed in section 6.1.

This combines to highlight the paradoxical nature of such business improvement projects. On the one hand a project plan is required to

secure funding and provide initial direction, but this plan needs to be flexible to accommodate changes that may result from external pressures or improvements in understanding the root cause of the problems.

6.3 Tools

Initial interviews took place at the beginning of the KTP project prior to any significant work being completed. The Associate discusses his intended approach to mapping the organisation's processes and gain understanding of the various systems. It is notable that he recognises the importance of speaking to employees, to gain deeper insight and also to capture ideas that they may already possess for making improvements:

> *Well firstly, we are going to umm, map the current processes, talk to the users, get their ideas…umm…and then, the plan is, once you have all the process maps, then you've got a good understanding of how the business works, that improvements will become apparent, through people's ideas, through holes, via the diagrams I suppose.*

Although no significant work has yet been completed some work has been done to begin mapping the business processes. The Associate highlights the value of this approach:

> *Good, because we are active.*
>
> *"You are learning by doing".*

This particular project was expected to require some reengineering of the computer based information systems (CBIS) as well as development of general management systems. To this end the Associate was introduced to Roll Activity Diagrams (RAD) as well as process mapping. RAD is an approach to mapping information systems and can be seen as a form of process mapping. He makes an interesting comparison of the process mapping and RAD techniques:

> *We've already turned some process maps into RADs.*
>
> *The RAD takes more thought, it's the type of job that is done 'back at the desk' not out in the company like process mapping.*

At the outset of the project the Associate has identified the value of close involvement with experienced personnel and highlighted the fact that RADs appear to offer less opportunity to engage in this. This is significant since it is the relationships between individuals that are known to be

important in the process of knowledge acquisition, as they share mental models and engender mutual trust over time (Fernie, Green, Weller and Newcombe, 2003; Szulanksi, 1996; Blackler, 1995). It can be construed that RADs, by not necessarily requiring individuals to interact, may be a less effective vehicle for knowledge acquisition than other forms of process mapping.

Blackler (1995) also highlights the significance of the form that the activity takes and its effect upon the subsequent knowledge that is gained. In this instance generating RADs required the Associate to engage with the same business processes as when generating Process Maps but with the objective of generating maps of the information systems associated with that business system. Consequently, very different maps are generated, and it can also be asserted that very different knowledge of the business will also be acquired.

Later in the project the Associate discusses a shift in the original project plans. The perceived problems with computer based information systems are mainly due to general management system failures: it is the use of the system rather than the structure of the CBIS that was problematic. When asked if he was sticking to the original project plans he replies:

> *Yeah* [hesitantly], *well I mean, the original plan really, I think when we actually got here everyone thought the big problem was that we had, sort of three system which didn't interface with each other whereas we've identified that that's actually not the problem the problem is the use of the systems and the shite data in them.*

During the discussions the Associate uses previously constructed process maps and RADs in order to discuss the details of the CBISs and management systems. In fact, he uses both RADs and process maps to show how the management systems and the CBIS interface.

It is often difficult to understand the way in which CBIS work since they are, by nature, virtual and intangible. RADs offer a way of capturing the workings of CBIS, in the form of a type of process map, and thus make their visualisation easier. It follows that it becomes easier to analyse them and determine ways to improve them. It is especially important, in this

instance, that CBIS and management systems can be visualised together so that combined system improvements can be made:

> *We did a Roll Activity Diagram…*
>
> *That was one of our initial ones, we decided to put the three databases on a piece of paper…and put a load of processes around it,*
>
> *So you actually get rid of two processes there, because this is the new jobs in the day you won't need that any more and the Engineer hours which you work out against the jobs you can do that in there* [Pointing to Roll Activity Diagram].

The importance of involving other employees in the activity of process mapping is shown when the Associate mentions that he has sent his process maps to the relevant people:

> *Fired them off to them,*

At first this seems as though the process mapping has been undertaken without the involvement of other employees. However, it transpires that the maps are sent to the persons that own or use the process day to day and not to the department or functional manager:

> *No the people that do it.*

Further inquiry shows that the close involvement of other employees, as originally intended, is being achieved:

> *Generally they say 'oh I don't quite do it that way' so we've sort of modified them.*
>
> *I think you have to sit there and talk them through manually*

During the later stages of the project, when significant changes are being made to the organisation-wide management systems process mapping is still being used as a tool for exploring further opportunities. They therefore appear to be used as at this stage of the project as general discussion documents between employees. As indicated by Luck (2007), Ewenstein and Whyte (2007) and Keller and Jacka (1999) these documents are utilised as facilitators of discussion and therefore as enablers of knowledge development, creation and transfer; or, as Boland and Tenkasi (1995) state, they are utilised as artefacts that enable perspective-making and perspective-taking to take place.

Not only are the maps being generated to highlight problems and opportunities but they are also used as explanatory and discussion documents within the organisation:

> *I did do some process models recently as part, with that procurement…module. When I had to, when I showed the guy in Finance I process modelled two methods so I could highlight the problems with the other guys method so that he had it to look over.*

RADs had also been used but to a limited extent. It appears that the main reason for not using them to a greater extent was their relative lack of value as a discussion document:

> *I generated, I started that as a Roll Activity Diagram and then I did it as a process model because it was easier to it was it was clearer. If I'm going to show other people then it was clearer.*
>
> *You can always get as much information down on a normal process model if you colour code it umm a RAD does look rather off-putting if you don't know what you're looking at.*
>
> *I can see, they both have a time and a place really…like you can capture more in a RAD I think. But you can't show other people it.*

6.4 Rules

This particular element does not surface within the discussions except when the Associate notes at the beginning of the project that the organisation appears to have little in the way of formalised working systems:

> *...there doesn't seem to be much…control…that's not the word, there's no…I suppose control **is** the word, there's no control, there's no set way of doing anything really. It's all sort of, just been bodged together almost.*

Observation suggests that this statement, made at the very beginning of the project, is not based upon objective evidence. Later work identifies many improvements that could be made to working practices, but no areas are identified where there is a lack of procedure.

At one point the problem of another employee, hereafter referred to as person C to maintain anonymity, making changes to the management systems without informing anyone else is raised:

> *He changed all the regions … the regions are set up so these Engineers all belong to this region, and he changed them all on his own.*

While this could be considered a factor to be associated with organisational Rules, the individual responsible for making these changes is the subject of considerable discussion under the element of 'Community' and the emergent element of 'Skills' discussed later. Failure of the individual to notify anyone else of the intended changes appears to be more due to the individual's failings rather than failings in the organisation's formal procedurisation of work.

Where new systems were developed, the process maps had been used effectively to generate new, formalised working practices and procedures. This points to process mapping as being an activity that not only provides an approach to gaining understanding of existing processes but also as a mechanism for recording existing and proposed working practices.

6.5 Community

The Associate points out his relationship with one particular employee, person C, that causes problems. Person C appears to have significant responsibility within the organisation although the Associate and other employees note his shortcomings:

> *...he knows a lot about the business, I don't deny, umm, but he's umm, a lot of it, a lot of what he does is all self-taught and he's sort of stuck doing everything in Microsoft Excel and Access…which, and he's not, his people skills aren't brilliant either.*
>
> *The IT guys they cant stand it because he's firing off these fuck-off huge spreadsheets that they open here through the network and it absolutely just kills the network all the time and he doesn't think about anything like that.*

Some of person C's difficulties seem to be due the KTP Associate posing a potential threat to his relatively senior position in the organisation:

> *...he sees himself as, his title is Process Manager, he sees himself as The Golden Boy, almost, you could say. And, umm, he's the, he knows a lot and he's the only one who knows how specific things are done, because he's reporting on it all, he's the only one who knows a lot about the databases and a lot about stuff...which, makes him very important.*
>
> *If he was, you know, to leave tomorrow, the company would definitely have issues.*
>
> *I think, I think that really it started with him going on the defensive with my me coming in to the company because effectively a lot of what I was brought in to do is looking at things that he's had some ownership of in*

the past, so he was immediately on the defensive, he was always dropping director's names into conversations and all of that sort of, rubbish.

Observation shows that the tensions in this relationship did not adversely affect the project during its early stages. However, the potential for this to have a significantly deleterious effect was recognised by the organisation's senior management, to the extent that person C was moved, both physically and in terms of duties. The Associate comments:

They've taken him off my project to clear the way for me.

And off, off the sort of pretty much off any sort of IT and IT development projects.

He's just solely reporting, they've given him the job title Quality Delivery Manager or something along those lines.

The Associate is quick to highlight that these changes will not result in a complete cessation of his involvement with person C:

Oh I do speak to him from time to time and if I've got something I need to talk to him about I'll pop up and chat to him about it, I'm not funny about it. You know I'm not gonna deliberately avoid him.

This is encouraging for the project since it indicates that it is not necessary for tensions between individuals to result in failure to achieve the ultimate goals.

Interestingly, the Associate highlights some difficulties that he encountered with the Finance Department. While this department had undergone some changes and improvements to its management systems these had been at the behest of the department manager:

I went and had a chat with the Head of Finance before we got to rolling out to see how he wanted to do it, did he want me to take the lead on it, him to take the lead on it, and he was adamant that he wanted them to take the lead on rolling it out on them actually using it so I just project managed the technical side of it

The nature of the problems was predominantly around problem identification and the seeming unwillingness of some individuals in that department to highlight these issues as early as possible. Instead, problems would be raised at infrequent meetings. The Associate makes a point of discussing his efforts to fix these problems as soon as they were raised:

It wasn't even a meeting it was just when I'd gone in there for some other reason to talk to them about something, umm and that's when they'd mention another problem , I think that only happened a couple of times so it wasn't too bad but I did sort of say to them you know that you have to come and tell me and I'll just get these things fixed.

And I always made a point of getting their problems fixed properly even if they were ridiculously minor like 'this box is now in the wrong place' or just stupid stuff, I always made a point of getting it fixed for them

It is not clear the extent to which the department manager had prepared the staff for the changes that would be made by the KTP Associate. This is significant since the role of management in supporting knowledge acquisition activities and engendering a supportive culture is vital for effective knowledge acquisition (Fu et al, 2006; Alavi and Leidner, 1999; Mukherjee et al, 1998; Kim, 1993). Observation does show that the Associate presented his intentions to the department before commencing making changes. The Associates efforts to fix all problems as soon as they were raised was most effective however, and the level of disturbance from this department reduced over time:

It seemed to work umm you know they they quite liked seeing the system fall over but err that's stabilised now it's not happening anymore.

The Associate also highlights more mundane problems that are encountered but these are less significant and do not have a deleterious effect upon the project:

People cancelling meetings…Payroll and HR have cancelled meetings this week.

Also, trying to fit in with other people's schedules and jobs.

It's been like, difficult to get hold of people but that's like called life isn't it.

It must be noted however, that the effect of these reschedules and delays was minimised due to the changes in the project plan that were necessitated by changing commercial pressures: these activities were no longer key to the partnership's overall goals. The fact that the project plan was changed and refined during the early stages meant that these delays did not adversely affect the overall project goals and deadline. Had these delays occurred later in the project, or during a critical phase then they could have had significant negative effect.

6.6 Division of Labour

There are few tensions that arise within the element of Division of Labour, relations between the Associate and other members of staff, including senior management, appear well organised. The importance of clear rules and controls to successful knowledge acquisition has been noted previously (Fu et al, 2006; Mukherjee et al, 1998).

The wide range of business improvements that were identified by the Associate and were subsequently incorporated into the overall project goals were effectively managed and responsibility was devolved to appropriate persons:.

> *...this is the 'Team Track' and if you look you've got umm, there's an owners column on here somewhere, there you go*

The only difficulties encountered centred on the Associate's relationship with one specific member of staff, person C. Early in the project there is a suspicion that some of the Associate's work is encroaching upon the work that would normally have been done by person C; or encroaches upon the work that person C would have expected to have been given responsibility for:

> *I don't think he's intentionally a pain...it's just that he maybe considers us to be, umm, treading on his toes…I suppose he want in on what we're doing really.*

Fortunately for the project, the clear project responsibilities, identified in the 'Team Track', means that this tension has little effect upon the project deliverables. When asked if the project would be affected of person C left the Associate emphatically replies:

> *I think it would affect the business*
>
> *I don't think it would affect* [us and our project] *very much at all.*

As discussed in Section 6.5 the organisation recognised the potential effect this tension could have upon the project. As the Associate relates:

> *They've taken him off my project to clear the way for me.*

While this could be interpreted as a necessary move to release tension between individuals, caused perhaps by a 'clash of personalities, there is evidence to show that the tension was caused by more significant

problems. Person C retained his existing responsibility for daily information reporting to senior management, but he was removed from many of the items listed in the 'Team Track':

> *...off the sort of pretty much off any sort of IT and IT development projects.*

On several occasions during the project person C was observed to make significant errors of judgment especially when dealing with system developers:

> *...in some of the demonstrations for the service software he started telling all the suppliers he was going to be installing*

On other occasions he was also observed to make errors when working upon the organisation's management systems. These are interpreted as issues related to the elements of Skills and are discussed in the following section.

6.7 Emergent Element in Service KTP

The element Skills emerges at intervals during the KTP Project around the Associate and other employees. Most significant are those tensions surrounding the employee person C. Many of the tensions around this person are attributable to other factors and have been discussed in sections 6.4, 6.5 and 6.6. It is notable however that a combination of his own relative lack of skills and the senior management's apparent lack of skills, or at least their lack of appreciation of person C's lack of skills, contributes to the difficulties that were observed to surround this person:

> *Because he sees himself as, his title is Process Manager, he sees himself as The Golden Boy, almost, you could say. And, umm, he's the, he knows a lot and he's the only one who knows how specific things are done, because he's reporting on it all, he's the only one who knows a lot about the databases and a lot about stuff...which, makes him very important.*

Person C appears to favour Microsoft Access derived solutions to the majority of management system problems that were encountered during the project:

> *...you've got time sheet checking system...you can look here, here's his 'how engineered', "Access", what's the next one, Project System, "Access",*

I think what he would usually do is write an Access thing that would pull it out and then fuck around with it…

...he started here as a temp and he made a few charts for one of the guys and then they were like 'oh we'll keep him on he can make a few more charts' and then you know two and a half years later here we are.

This final statement also alludes to other people's reaction to the work that person C performs. They also appear to have relatively low skills, in terms of management system development and information system development, and they regard person C's efforts highly. As the Associate relates:

You can see why the Directors think the sun shines out of his arse though

...he had to show what he'd done you know that type of thing, and they thought his new Access project tracker thing was like amazing because it gives them the results at the end and that's all they care about. But, you could get an A-level student to write that database to be honest with you.

The general lack of skills, particularly information technology skills, is prevalent throughout the organisation. One event, retold by the Associate recalls:

Sue who does the invoicing, [Head of Finance] *sent her a spreadsheet the other day, she printed it, filled it out by hand, scanned it and emailed it back to him. You see where we're coming from?* [Laugh]

Interestingly, the organisation appears to have offered person C further training in database development. This would suggest that they recognised the need to improve his level of skills. However, person C apparently refused the training. If this was recognised by senior management as being a necessary skill for the business to acquire then one could expect him to have been instructed to partake in the training; or at least for the organisation to have identified a suitable alternative employee to receive the training. It appears though that the opportunity to acquire these seemingly necessary skills has not been taken, the Associate commenting:

They've offered to put him on SQL training courses before

Yeah and he's never done it.

I don't understand really why you would ever turn something like that down. It's just a bit odd.

The Associate also briefly relates his growing abilities to generate the diagrams as part of the process mapping activity:

> *Yeah I can generate a process map in no time but I don't think I was particularly slow before,*

He compares the process mapping activity to the roll activity diagram (RAD) technique, commenting:

> *...its quite hard to sort of say specifically because at a first glance they* [RAD] *look very complicated don't they, but its only once you learn how to read them that they're actually not. Umm it's tricky to say really.*

He draws attention to the value that a short training session provided and enabled them to engage with process mapping relatively quickly. Contrastingly, the RAD technique required significant levels of study:

> *That was also partly because we had that half a day seminar thing,*
>
> *Yeah a book,* [about RADs] *with* [KTP co-Academic Supervisor] *name in.*
>
> *He's like 'this is a good book to use' and you look at it and there's like his name!*

It is important not to ignore the inherent differences in complexity between generating a process map and a roll activity diagram. While this does explain the difference in rapidity of acquisition of the necessary skills to utilise each technique successfully, it also suggests that process mapping may be a generally more easily acquired and therefore more easily and cost effectively utilised technique.

6.8 Summary

Process Mapping was found to be a most useful tool in capturing details of the existing business processes and, perhaps more importantly, as discussion and training documents for the development and use of new business processes. The Process Maps were most often used as discussion documents about which changes and improvements to various business processes were discussed. In this particular case the Associate used two distinct forms of Process Mapping, one for mapping the business systems and the other for mapping the information systems. The Associate found that the business process mapping approach both required, and afforded, greater opportunity to engage more closely with

the relevant process owners. The involvement of the process owners in the construction and development of the process maps is seen to be important for their accuracy.

The Associate's level of motivation was of some concern during the project though was not determined to be at such a level as to threaten its success. The most significant factor that adversely affected his motivation was the shifting project goals. This though was alleviated when the Associate was successful in completing the new project activities.

The Associate's relationship with another key employee was found to be the most significant inhibitor to the performance of the activity of process mapping. The adverse affect that this relationship was having upon the project was eventually recognised by management before it could jeopardise the outcome. Management intervention was required both to physically separate the individuals involved and to separate their respective project goals and activities so that they did not affect each other's work.

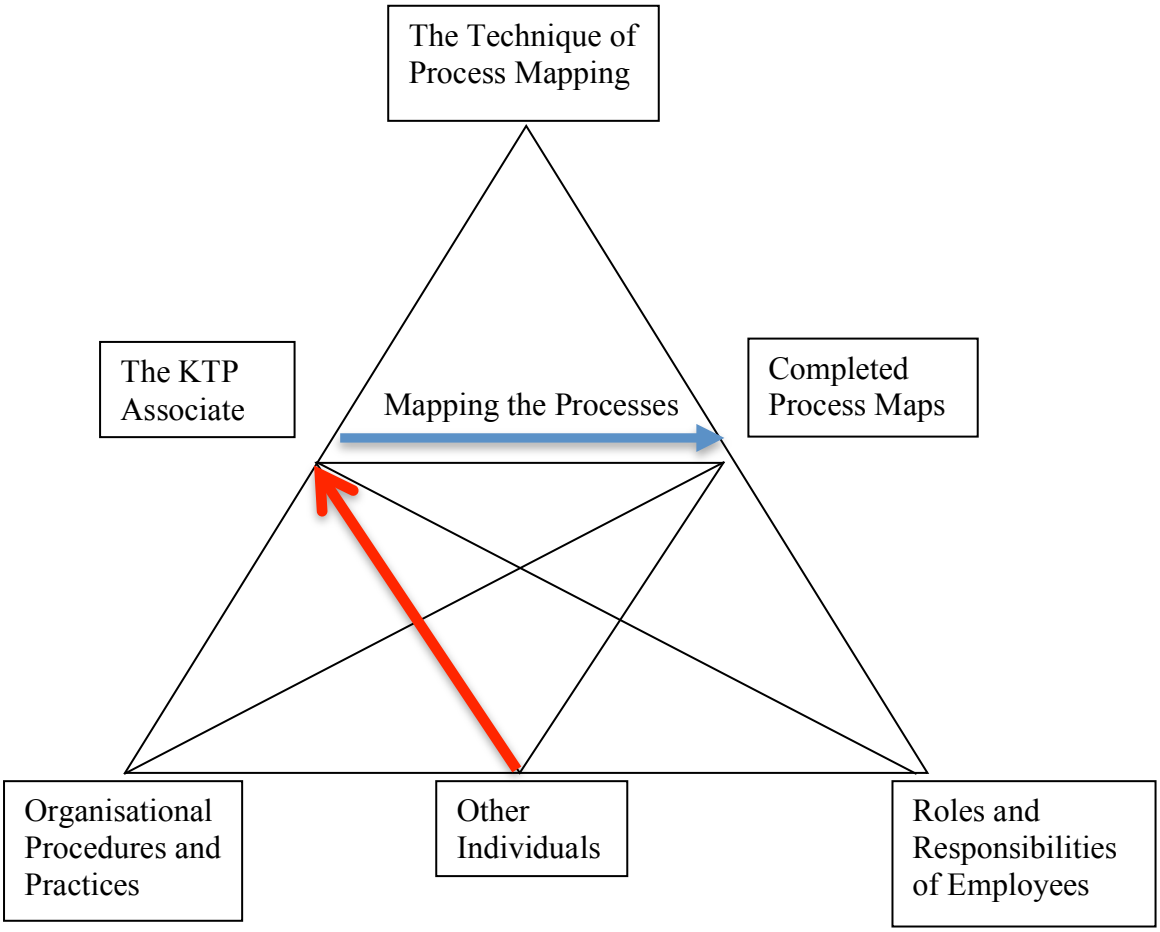

Figure 6.1 Sources of Significant Tensions in the Service KTP

7.0 Analysis of Military KTP

This chapter presents the analysis of the data captured through interviews with the Associates of the Military Knowledge Transfer Partnerships.

This KTP was initiated to develop and implement a New Product Development (NPD) process to improve the efficiency and effectiveness of new product introduction. In developing this business process it was expected that the KTP would also identify and deliver other, smaller business process improvements. It was initially envisaged that the KTP would deliver improvements in design for assembly and design for assembly/manufacture (DFA/M) processes and practices. Ultimately it also delivered improvements in strategic supplier development processes.

It is notable that this particular knowledge transfer partnership began in July 2009. The initial interview for this study was not conducted until six months later when the project plans had been refined and more clearly stated. During the intervening period the Associate was involved in a variety of activities within the organisation to gain an understanding of the business sector and the way the organisation operated on a day-to-day basis. The activity of mapping the business processes commenced in April 2010 at which point the sequence of interviews began.

The appearance of an emergent element is identified and discussed (section 7.7). This element suggests that the skills and abilities of individuals that comprise the activity system are a further source of tensions, or disturbances, that affect the performance of the Activity.

The dates that the interviews were conducted are indicated below -

Interview 1 2nd April 2010	Interview 2 22nd June 2010	Interview 3 16th February 2011	Interview 4 7th July 2011

Section 4.2.2 discussed the use of semi-structured interviews as the primary source of data capture, supported by instantaneously sampled field notes. It also identified other sources of data that may be utilised to provide rich insight into the KTP activities, including formal and informal meetings and discussions. In the case of the Military KTP the Associate maintained a comparatively low degree of communication with the Academic Supervisor: aside from formally scheduled meetings, face-to-face discussions only took place at the university, further minimal correspondence took place via email.

While no quantitative analysis has been made, communications appeared to increase after significant milestones had been passed. Many of the discussions between the Academic Supervisor and the KTP Associate took place around formal documentation. This included existing and newly generated process maps, KTP progress reports and other documents, such as investigative reports, produced by the Associate. These often occurred within the semi-structured interviews and also contributed to the collation of the instantaneously-sampled field notes.

The majority of communications that were initiated by the Associate tended to be in response to results that the Associate deemed unsatisfactory and took place, at the Associate's request, at the university's premises. For example, the negative response to the completion of a significant report upon the organisation's activities (see section 7.5) resulted in a series of face-to-face discussions. Such occurrences were frequent causes of tensions in this KTP.

7.1 Subject

The Associate experiences great frustration during the early stages of this project. There are some critical commentaries of the systems and practices in the organisation but the overriding problems surround the attitude of the majority of the senior managers in the organisation:

> *If you criticise the company gets very…what's the word, umm…they don't like it very much* [laughs]*…they get very defensive and you won't get anything moved forward.*
>
> *…there's no 'right lets take that forward'*

At first it was unclear whether this frustration was due to the Associate's apparent high level of motivation and desire to make a significant contribution to the development of the organisation. Over time however, observation by the Academic Supervisors also identified the management's reluctance to change. In an attempt to secure the commitment of the management team a number of steering groups were set up with responsibility for various elements of the project:

> *I've set up a different steering group to look at design for manufacture*

Each steering group included members of the Senior Management Team (SMT). It was envisaged that responsibility for delivering specific parts of the project would secure individual manager's commitment. During discussions with the various steering groups and individual senior managers it appeared that some headway had been made and verbal support for the project was growing. However, observation by the Academic Supervisors revealed that the rhetoric was not executed in practice.

The reason for the lack of management support was not immediately obvious. Most managers, when individually questioned, were openly in support of the KTP project, however, their later lack of action did not reflect this. Some of the reluctance to change may be due to their institutionalisation:

> *...many of the senior management team and other workers have been within the organisation for 25 or 20 plus years*

As previously stated, this was recognised by the Associate and she made reasonable efforts to accommodate this in the way that the purpose of the project was communicated:

> *...it is getting people to recognise that things aren't right is a big issue without offending them to the point where they won't work with you*
>
> *I think that's a really really difficult thing to do because effectively if you say 'well this isn't working quite right' you're effectively saying 'you're doing it wrong'*
>
> *...some people would take that with 'oh that's great she's trying to help us' and others will sort of go 'what you're telling us we're doing it wrong, we're dong it fine' and I think it's more the latter reaction that I think I've had.*

Section 7.5 discusses a detailed report that the Associate produced that outlined the numerous areas for improvement in the organisation. This report was criticised for being:

> *Critical not analytical*

This comment was made despite the report containing significant data to confirm the value of the suggested improvements. Observation shows the considerable effect this had upon the Associate. Surprisingly it did not result in demotivation, rather the Associate was initially extremely angry and annoyed that the organisation was not taking advantage of the opportunities she had identified. The Associate remained angry to a considerable degree for the remainder of the project.

Later in the project the organisation's lack of awareness of the purpose of the KTP and the work that had already been undertaken is still evident:

> *I had a catchup with the MD which I've not had for six months or more*
>
> *I'd been telling him about it [the process maps] every time we'd spoken before, and he suddenly he sort of went "oh that's great, oh yeah tell me when that's done ... oh when did you start doing that"*
>
> [To which the Associate replied] *"oh twelve months ago or more"*
>
> [He responded] *"oh I didn't know that"*

In order for the KTP to be successful in delivering its intended outcomes it had become necessary to reconfigure the project's goals. Whereas it would usually be the intention to implement the majority of potential improvements that the Associate had identified, the project was changed to focus upon the delivery of a single significant improvement that would require the least degree of involvement and support from the SMT. The remaining improvements that had been previously identified would be published as recommended improvements for the organisation to pursue after the KTP project had been completed: where possible, the Associate would quantify the scale of benefits that each improvement could deliver along with an outline implementation plan.

7.2 Object

The Associate highlights, at an early stage, how the objectives have been modified since the start of the project. In particular she notes how the

project objectives appear to have been interpreted differently by the organisation and the university:

> *...the overall spec is to develop a robust supply chain management strategy... with the existing products but also for new products*
>
> *...the initial thought from the company was that it would be sorting problems out in suppliers and looking at lean manufacturing in suppliers*
>
> *...the way the university ... interpreted it was to look at both internal and external processes but the way the company had interpreted it was, we want to improve our supply chain, that means we've got to go and sort out our suppliers*

Despite the disparity between initial interpretations of the project goals the route to achieving the development of a 'robust supply chain strategy' requires the design and development of a business process:

> *...we've identified umm the business development process needs documenting so, there's a key process that can be followed through instead of it being done in a kind of ad hoc manner.*

The current ad hoc manner of working is emphasised when the Associate relates the staff interviews that were conducted and revealed that Engineering and Purchasing do not coordinate their activities with key suppliers:

> *...the general consensus is that they do sometimes work with suppliers when its felt its really necessary umm but when they work with suppliers they don't generally inform purchasing*

Consequently, there was a need to develop a method of process mapping these areas. The process mapping approach would be used to both capture information about the existing processes and activities that contribute toward new product development, which incorporates strategic supplier selection and development, but also to generate a working procedure for employees to follow in the future:

> [it will be recorded as] *a flow process or just well stage gate process really, umm...in the form of a diagram*

Furthermore, process mapping would be used in order to indicate to internal staff the nature of problems that the Associate encountered during her investigations, for example:

> *...we use free-issue parts so we'll get parts made by a different supplier get them in they'll sit in stores for a day or two umm not sure how long yet which is why I need to document it and map it*

While the Associate had identified a minor difference between the way in which the project objectives were interpreted by the organisation and the university, there appears to be a further level of misinterpretation within the organisation:

> *...one of the biggest problems I've had so far is that different people have interpreted the project in different ways*
>
> *...my direct manager seems to think that I am based only in purchasing ... but on other occasions he will acknowledge that it cant just be based in purchasing because that's not gonna achieve anything in total supply chain management*

Observation indicates the problems that a lack of clear direction has produced. While the Associate has pursued the generally agreed objective of improving the organisation's supply chain management processes and practices, a significant number of smaller projects have been incorporated into the overall plan: these include DFA/M workshops, supplier selection, new product design and development activities. At the approximate mid-point of the project a significant amount of work has been expended in scoping each of these projects, and though some significant headway has been made in achieving the main project objectives, there is a risk that these additional sub-projects consume time and resources that need to be spent on the main project objective. As the Associate relates:

> *Umm, I started off looking at the existing supplier base umm looking at that in quite a lot of detail umm so I got some data out of their ERP system I was looking at performance*
>
> *Umm so I did a lot of supplier umm visits I did a supplier questionnaire umm I've looked at their ERP system a little to find out,*
>
> *I've also done lots of staff interviews, I've initiated the DFA/M project, I've initiated documenting the business development project, I've got a third steering group which is about to start looking at umm, how to group suppliers or best way of grouping suppliers*

And, when asked by the Academic Supervisor 'how are you going to manage to do all those things before you retire' further notes:

> [laughs]

Err I don't know, I really I don't think I've got a lot of resource in the company and I think that's probably one of the biggest problems umm, and…it got brought up at my last LMC and I got told that I had to just go out and get people to do stuff for me.

Which is fine but if the people in the company don't realise that that's what I'm able to do then, it's not going to work very well.

Recognising the danger that these multiple projects and lack of general consensus and support present to the overall project plan the Academic Supervisors attempt to provide clarity. It became necessary to identify elements of the project that could be completed with minimal reliance upon support from the organisation's management and staff:

...the project plan that I've developed can take me pretty much through to the end of the KTP and it's got lots of little aims which will culminate in the overall report so I'd say that's pretty clear.

...other stuff will require input and if I don't get it then I'll just have to say it could be, this saving could be improved by this amount if you actually move forward with these ideas.

I think also the KTP office can say 'well that's not part of the original brief' umm, which got questioned at the last umm LMC

In conclusion, the KTP project aimed to create and implement a system for supplier classification and management, based upon their strategic importance to the organisation. In addition, the Associate would generate a list of potential further improvements, including their cost benefits, that the organisation could adopt after the KTP had finished. This would enable the KTP to fulfil its project objectives.

7.3 Tools

The Associate begins the project by attempting to understand, in broad terms, how the organisation works. From this, several processes were identified that appeared to be unstructured and would be fruitful areas to make improvements:

...at the moment we've identified umm the business development process needs documenting

When discussing the method by which the Associate would capture the way the current process operates, she states that this has not yet been done even though the importance of recording this information is appreciated:

...not at the moment [because] *it's difficult to do it.*

The value of having a record of the existing, and proposed, processes is understood and the Associate had considered how these records could be stored and be of value to the organisation

It'll be documented in the quality procedures.

...it could be the form of a diagram it could be a list of questions that need to be addressed at each stage

Mapping organisational processes is also seen as being of value in demonstrating the current state of the organisation to other staff members and senior managers. Specifically, when discussing the mechanisms by which component parts are ordered and transported, the technique of mapping is highlighted:

...another problem that we face with our suppliers is we use free-issue parts so we'll get parts made by a different supplier get them in they'll sit in stores for a day or two umm not sure how long yet which is why I need to document it and map it

...so we need to map clearly what's going on because another key issue that suppliers have come back to me and said they have is that well actually we could make this stuff on time if we got the free issue stuff on time

Although process mapping is recognised as being useful, there is a recognition that some techniques are more useful in some applications than others, even though they are broadly similar in approach. For instance, when again discussing the supply and distribution of free-issue component parts:

I am intending to use value stream mapping…how I'm not too sure yet.

Value stream mapping for the shop floor certainly

I don't think I can do a value stream map for the modules or the components that go in and out and in and out and in and out because it will be a map that goes all over the place

To this, the Academic Supervisor suggests the use of a string diagram, but the Associate had no understanding of this method. When engaged in constructing some maps of the more complex business processes the Associate identifies one of the problems that are often encountered when process mapping. When maps are constructed by interviewing individuals, or allowing individuals to construct maps of the business

processes for which they are responsible or knowledgeable, they are often incorrect. The role of documents and artefacts in facilitating the development, creation and transfer of knowledge through discussion and enabling perspective-making and taking to take place is well known, and a significant determinant of knowledge acquisition success (Luck, 2007; Ewenstein and Whyte, 2007; Keller and Jacka, 1999; Boland and Tenkasi, 1995). The following conversation between the Academic Supervisor and the Associate demonstrates:

> *Did you actually see what people actually did?*
> [Associate] *Yes*
> *Was it the same as what the people said they did?*
> [Associate] *Not all the time no.*

This serves to reinforce the importance of using direct observation to construct process maps. While the input of knowledgeable individuals is useful in highlighting the subtle aspects of the process that are not always easily visible to an observer, or to highlight aspects of the process that only occur infrequently, it is imperative that the initial map is constructed by an impartial observer. Furthermore, as Fernie, Green, Weller and Newcombe (2003) and Szulanski (1996) state, the relationships between individuals develop over time and are significant in the process of knowledge acquisition: as relationships develop and trust builds so individuals are more able to share mental models through perspective-making and taking (Luck, 2007; Ewenstein and Whyte, 2007; Keller and Jacka, 1999; Boland and Tenkasi, 1995).

Toward the later stages of the KTP, process maps had been found to be extremely valuable, though not immediately of benefit to the organisation. Instead, during a supplier development visit the Associate had undertaken the task of mapping the supplier's stock control processes:

> *...the one that I did for the supplier, they've, we've redone it as a new process umm and they've eliminated some of their wasted time such as the Operations Director going and moving a rod from one rack to another and they were checking stock three times so that's all been eliminated the wasted time and duplicate activities and now we're going through more detail and breaking it down into the inspection process.*

At later stages the Associate also indicated that they had not been able to continue to generate process maps. This was found to be more due to the Associate's increasing workload and disillusionment with the organisation than an inherent weakness in the technique of process mapping. Increasing workload may be interpreted as management's failure to control the environment: this is a barrier to knowledge acquisition that requires careful management (Szulanski, 1996):

> *...in all honesty I've not presented a new business development process yet. Umm I need to do that, that ones just gone on the back burner.*
>
> *...well it wouldn't get followed anyway so it, it sort of, that doesn't sort of encourage me to spend hours going through stuff and putting this process together because they won't use it anyway*

Failure to follow existing process maps can be attributed, at least in part, to several factors. New maps that the Associate had attempted to generate had mainly been created by committee, without observing the actual working practices:

> *So we started documenting this process and they said "we do this, we apply these questions in our head, we do this"*

Keller and Jacka (1999) used process maps to "*heighten management's understanding*" (p62) of business processes, interviewing the individuals that 'own' the processes to gather the necessary data. They recognise the difficulties in generating such maps and resort to using two personnel, one to interview the process owners and one to generate the map: this approach is vital to enable the 'live' generation of maps that they deem is important in producing accurate maps.

Failure to observe actual practice lead to the generation of process maps that were desirable rather than representative of the real world, as the Associate pointed out:

> *...as it got towards then end, because it took three or four meetings to get to the last few stages, and it was just sort of like well you know that's best practice and you're just sort of you don't actually do it do you its just you're saying that*
>
> *...and in the end they picked up that's what they should be doing and told me that's what they're doing*

Other problems with the process maps are due to apparent problems with the construction of the maps themselves:

> *There is a change note process but no one knows it and no one follows it and its over-complicated*
>
> *...and it bodes well that they* [all company processes] *all are written by the same guy*

Assigning responsibility for process map development to one person is interesting: experience and the literature suggest that most organisations employ the process owners or responsible managers and staff to assist in the development of maps, if not to develop the maps in their entirety by themselves. It is of particular concern that the person responsible for generating maps in this organisation has a questionable ability to produce them in a satisfactory manner:

> *I got him as an exercise … to do some process mapping*
>
> [she begins to redraw the map he generated and describe the various stages]
>
> [The interviewer observes that there are many flaws, logical errors, with the process map that was generated]
>
> [The Associate asked him] *"what do you do when you've got two arrows going into the same box with nothing going out?! If you've got no output from it, why's it being done?"*
>
> [To which the Associate says his reply was] *"ohh, err, ummm"*

Section 7.7 discusses the lack of satisfactory skills in process mapping and are identified as an emerging element.

7.4 Rules

The need for rules and procedures to govern the organisation's operations is highlighted by the Associate when discussing the main objectives of the KTP project:

> *...we've identified umm the business development process needs documenting umm so, there's a key process that can be followed through instead of it being done in a kind of ad hoc manner.*
>
> *...it seems rather rushed and there's no clear sort of gating process*

Interestingly, the Associate notes that the establishment of rules in the form of written procedures will not necessarily result in people working according to them. As is mentioned in section 7.5, those members of the

senior management team that the current procedures list as being mandatory did not attend the Business Development Meetings. Furthermore, that even the people who are involved in developing the new working methods may not adhere to them. Still, in order to maximise the likelihood of the procedures being adhered to, the Associate utilises those personnel in the development of the rules:

> *The idea that it's a cross-functional team involved in developing it and the people who will supposedly be using it is that they'll have had an input to it and therefore know it, know what it comprises of umm when its meant to be implemented and they'll also have bought into it by the fact that they've been involved in developing it.*

Also mentioned in sections 7.5 and 7.6 of this analysis, there is a specific problem between Engineering, Purchasing and their coordinated dealings with key suppliers:

> *...the general consensus is that they do sometimes work with suppliers when its felt its really necessary umm but when they work with suppliers they don't generally inform purchasing*

It is pertinent to note that this is not an infraction of formal company rules since the requirements to inform Purchasing of any dealings with key suppliers is not written in any procedures. However, this particular expectation could not be considered to be unfair or burdensome, and could be simply stated as 'courteous' practice between departments. There is therefore a tension between maintaining simple and effective company procedures and documenting all activities that the company expects to take place in order to operate effectively. One can speculate the degree to which all 'courteous' and common sense behaviour could or indeed should be formalised in organisational working procedures.

While the Purchasing Department appear aggrieved by this lack of courteous communication from Engineering it is most interesting to note that Purchasing are found to ignore their own written procedures: procedures that, if not followed, have potentially more damaging repercussions for the organisation as a whole:

> *...for example purchasing guys err still purchase off people who are on the non-approved supplier list, we had over £120k worth of spend on the analysis I did with non-approved suppliers but as an AS9100 company*

that is a big big no no [laughs]. *You would lose your accreditation pretty much for that.*

It would therefore appear that the tensions observed between Engineering and Purchasing are related more to inter-departmental relationships than to any arguments surrounding the formalisation of working procedures.

When discussing the factors that may constrain the project from successful completion the Associate relates the difficulties in highlighting errors with the way that people currently work:

I think that's a really really difficult thing to do because effectively if you say 'well this isn't working quite right'

It is particularly difficult when you are challenging working practices that have been developed over many years:

...you're effectively saying 'you're doing it wrong'

While some people will react positively to such criticism, others do not:

...some people would take that with 'oh that's great she's trying to help us' and others will sort of go 'what you're telling us we're doing it wrong, we're dong it fine' and I think it's more the latter reaction that I think I've had.

It could be construed that the formalisation of working procedures and rules would enable future change initiatives to progress more objectively: people are less likely to feel personally criticised when processes are reviewed, changed and improved. Although this particular KTP study takes place over an extended period of time it's objective is to implement formalised working procedures. There is therefore little opportunity to observe the difference between change initiatives that occur to formalised working practices and those that occur to non-formalised working practices: this may be a productive avenue for future investigation.

7.5 Community

This project was particularly complex, requiring the Associate to make improvements in several key areas of the organisation. The KTP project primarily aimed to improve the way in which the supplier base is managed and developed, including the methods of approving key suppliers, it also aimed to develop a new product development (NPD)

process, and to initiate a design for manufacture (DFM) initiative. Along with these main objectives, there are a number of shorter-term milestones and relatively simple operational improvements that were identified for implementation.

The project required a considerable amount of data gathering on the part of the Associate, most notably from key personnel within the organisation. As the Associate notes:

> *...it's gonna require a lot of internal or reviewing of internal processes umm especially things like design for manufacture umm which isn't used at all at the moment in the company.*

Much of this data gathering was undertaken by observing the organisation 'in action' during the early days of the project and by observing some of the immediate problems. This also aided the Associate in forming closer personal relationships with the key personnel:

> *I've attended all the business development meetings umm I've attended all the meetings for a new product that is coming through…umm, and observed how it is developed and how it goes through one…sort of stage to the next.*
>
> *...and it seems rather rushed and there's no clear sort of gating process*
>
> *...the ... manager wrote a report and put that to* [the senior management team] *and just took it round and got each of them to sign it individually.*
>
> *Umm, and personally I saw him get one of the managers to sign it and he didn't even read it.*
>
> *If you criticise the company gets very…what's the word, umm…they don't like it very much* [laughs]*...they get very defensive and you won't get anything moved forward.*

In order to overcome some of the problems surrounding key people's apparent aversion to criticism and change the Associate arranged for Steering Groups to guide the development of key process changes. These Steering Groups were intended to provide the project the necessary support to ensure its successful completion.

> *...we've set up a steering group with different people from different departments umm so it can get err an objective overview*
>
> *The idea that it's a cross-functional team involved in developing it and the people who will supposedly be using it is that they'll have had an input to it and therefore know it, know what it comprises of umm when its*

meant to be implemented and they'll also have bought into it by the fact that they've been involved in developing it.

While these steering groups were useful in raising the profile of the KTP project and the significance of the changes and improvements that it recommended and delivered, they were not as effective as the Associate had hoped. One of the persistent problems was a tendency for the group to digress from the subject under discussion:

Well, we spent several meetings trying to get through it and people kept digressing and getting defensive

Of particular concern is the defensive nature of some members of the steering groups. Observation also reveals the tensions between individuals within the organisation that caused considerable disruption, not just to this KTP but also to the daily operations. The effect of this upon the KTP was discussed in section 7.2.

The communication and coordination issues also extended beyond the immediate boundaries of the organisation. In particular, the relationship between Engineering, Purchasing and Suppliers do not seem well coordinated:

I've interviewed umm the engineering staff within engineering, the general consensus is that they do sometimes work with suppliers when its felt its really necessary umm but when they work with suppliers they don't inform purchasing who they're working with or why…or get recommendations off purchasing who deal with suppliers on a regular basis.

The main tensions surrounding the project initially appeared due to a lack of understanding of the project's purpose within the organisation. Part of this would appear due to poor communication of the project's purpose prior to its inception, and this has caused tensions with specific personnel that interpreted it as a threat to their employment. Since project inception however, there remains considerable tension over the exact purpose of the project:

...one of the biggest problems I've had so far is that different people have interpreted the project in different ways

...my direct manager the purchasing manager he seems to think that I am based only in purchasing sometimes but on other occasions he will acknowledge that it cant just be based in purchasing because that's not

gonna achieve anything… whereas his boss still doesn't quite realise that and sees me as only affecting procurement

...no one at the company was told that I was starting or what I was starting to do umm and one of the guys in quality thought I was taking his job because that's what he thought I was employed to do

When discussing the daily environment, the Associate relates to the difficult working relations and poor communication:

I have to overhear conversations because I sit right by them and if I overhear a conversation it's very difficult to say 'hold on a minute include me in this' because its conceived as rude but, effectively that's the only way I'll get involved because they're not involving me in stuff.

The Associate relates further difficulties and a lack of communication and coordination within the company when noting the impact of a parallel KTP project that has begun within the organisation:

...there's a design KTP who's looking at…design for manufacture and assembly which is what I'm working on…and following on from that they want to look at whether we make stuff or buy stuff and I just went [sharp intake of breath from the Associate] *"woah" that IS my project that is supply chain strategy that is what I am here to look at…umm so umm I mean I go I went to speak to my boss about that and he was taken aback as well which just shows the sort of lack of communication in the company*

At a relatively early stage of the project the Associate recognises and calls for the visible support of the Senior Management Team. Additionally, pointing out the need for them to acknowledge the organisation's own shortcomings.

I think really what I need for now is the SMT to stand up and go '[Name's herself] *has been tasked to do this we are giving her the authority to go ahead and do it please work with her'.*

It is important to recognise that the Associate can appreciate the reasons for many people's reluctance to change and recalcitrance at critical commentary:

...many of the senior management team and other workers have been within the organisation for 25 or 20 plus years

The Associate is however aware of their position in the organisation and how others may perceive her and perceive the project:

...it is getting getting people to recognise that things aren't right is a big issue without offending them to the point where they won't work with you

> *And if you've got someone who's been there who's younger than the length of time you've been at the company and they're telling you how to run it or change the way you're running it I can understand why that would be a little bit…well sensitive*
>
> *Personally I need what I need to do is try not to offend anyone* [laughs] *don't upset anyone umm and to get buy in from staff get them to see the benefits that they can gain from it…umm, help to see that if by making this one change yes it might be a bit of a struggle at first but it will improve their working overall*

The request for management support is a recurring theme throughout the project. What was originally interpreted as a lack of understanding of the purpose of the project, possibly caused by poor communication of the project intent prior to its commencement, appears to be only partially correct. As the project develops it becomes clear that there is an inherent tension within the company's management team.

Towards the middle stages of the project the Associate had made continuous efforts to communicate her project goals to the organisation. While this was generally well received by most staff it appeared as though several key staff were still not wholly supportive of the project:

> *I'd done a series of presentation to the office… that was really well attended I think that was that went down really umm, and I think there's only a couple of people really in the company that I feel aren't really on board with it… the senior quality engineer, umm, and my boss's boss*

The Associate later produced a report that summarised the findings of the KTP investigations so far. This was a comprehensive document, circulated to all senior managers and key functional personnel:

> *...everything I wrote was backed up by facts and figures and yet I still get the project facilitator umm* [name's the person] *who's like umm my supervisor's boss giving me comments on it and he umm had half a page of err there was half a page blank of A4 and he just put question marks all the way along and wrote 'not true' and then you'd get to another bit and he'd write 'not true' and you're there going 'but the figures are there to back up that comment I've not put my own opinion I've not put anything like that all I've done is put facts from the research that I've done into the company*

This serves to highlight the management's resistance to change and criticism. The majority of comments made upon the report are concerned with petty formatting issues, others are made that contradict the substantial evidence contained within the report. Interestingly, the senior

manager's opinion is not reflected in the comments of the company's Finance Director who stated:

> *...this is a fantastic report but who's gonna drive the recommendations forward*

As previously mentioned, the lack of cohesive support from the organisation's management team had a direct and negative effect upon the project. Section 7.2 discussed the considerable changes to the project goals that had to be made and section 7.1 discussed the personal effect this also had upon the Associate.

7.6 Division of Labour

In order to overcome some of the problems regarding staff engagement and commitment (discussed in Sections 7.2 and 7.5) several steering groups were set up to control and support the development and introduction of new business processes. The KTP project can therefore be interpreted as having contributed to the division of labour within the organisation. The Associate relates the purpose of the steering groups:

> *The idea that it's a cross-functional team involved in developing it and the people who will supposedly be using it is that they'll have had an input to it and therefore know it, know what it comprises of umm when its meant to be implemented and they'll also have bought into it by the fact that they've been involved in developing it.*

Difficulties surrounding the steering groups and the organisation's general management are discussed in section 7.2 and 7.5. Other, specific examples of the lack of management's cohesion and collective support of the organisation and each other, are reflected in the Business Development Meetings:

> *apparently to get a project through they would have three members of SMT one of which would be the MD, umm, and the other the Engineering Director umm I've never seen them in any business development meeting*

Management support is an issue that is frequently raised by the Associate throughout the project and is discussed in sections 7.2 and 7.5. The issue of support from other non-managerial staff is also noted by the Associate. Specifically, many of the staff are unable to devote time to assisting the Associate and this results in considerable delays. Staff time must be booked to discrete projects and the KTP is not identified as an

organisational project with a budget that staff can book their time to. At the time of completion of the KTP this had not been addressed.

The organisation appears to suffer from poor communication and coordination between some departments. Observation confirms the often-competing objectives and uncoordinated activities:

> *I've interviewed the engineering staff to work out if they work with suppliers ... the general consensus is that they do sometimes work with suppliers when its felt its really necessary umm but when they work with suppliers they don't, inform purchasing who they're working with or why*

This lack of coordination and communication does not merely result in duplication of effort but can have material effect on the suppliers:

> *...which then causes problems because they've annoyed a supplier umm or potential supplier by getting them in to do the work with them and then not given them the overall contract.*

While it can be argued that the division between Engineering and Purchasing is a logical one, and is one seen in most if not all manufacturing firms, it can result in material harm, not just to the suppliers, but in the long term, to the organisation. It can be postulated that such actions may have a deleterious effect upon supplier relationships and inhibit efforts to manage and improve the supply chain.

Poor coordination between departments also has a significant negative impact upon the KTP project itself. The Associate relates the difficulties encountered when different Directors apportion different objectives and responsibilities to concurrent projects:

> *...there's a design KTP who's looking at…design for manufacture and assembly which is what I'm working on…and following on from that they want to look at whether we make stuff or buy stuff and I just went* [sharp intake of breath from Associate] *"woah" that IS my project that is supply chain strategy that is what I am here to look at…umm so umm I mean I go I went to speak to my boss about that and he was taken aback as well which just shows the sort of lack of communication in the company*

Individual Directors also contribute to problems surrounding organisational coordination. A specific instance surrounds the implementation of a design for manufacture activity that is seen as critical for the company's profitable operation. After some time the initiative lost momentum and the Director that initiated the project stated:

...'well I expected engineering to pick it up and run with it'

Such an attitude and laissez faire approach to management is congruent with the Associate's efforts to introduce steering groups for all major process change activities, thereby minimising the opportunity for miscommunication and lack of coordination.

Communication and co-ordination issues also abound within individual departments. The Purchasing department is responsible for identifying and managing the list of approved suppliers, that is, those that meet the stringent requirements of the end customers, several of whom are military organisations:

> *...purchasing guys err still purchase off people who are on the non-approved supplier list, we had over £120k worth of spend on the analysis I did with non-approved suppliers but as an AS9100 company that is a big big no no* [laughs]. *You would lose your accreditation pretty much for that.*

As the Associate identifies, this is not merely a matter of failing to adhere to company procedures but it could result in the loss of AS9100 accreditation. Without this accreditation it would not be possible to maintain the organisation's position as a supplier to military customers.

Recognising the significance of the poor communication and coordination within the company, and the potential effect it may have upon the success of her own project, the Associate highlights the need for visible collective support. She also reiterates the problems that occur when activities and efforts are not well communicated:

> *...the design umm KTP is looking to take on that was an idea from the engineering director and it hadn't even occurred to him that it would cross over what I'm doing which screams that he doesn't really understand what I'm there to do.*
>
> *...another member of the SMT had this great idea to look at whether to make or buy stuff and we're gonna set up this other KTP project to look at it but doesn't have a clue that you're* [already] *looking at that.*
>
> *I think really what I need for now is the SMT to stand up and go '*[this project] *been tasked to do this we are giving her the authority to go ahead and do it please work with her'.*

7.7 Emergent Element in Military KTP

From the start of the project the Associate identifies the need to record the current activities of the organisation in the form of a flow chart or process map. Although the exact type of charting method has yet to be decided upon she recognises that there are many versions to choose from. When asked about how the new product development process would be captured and examined she replies:

> *...a process, either a flow process or just well stage gate process*
> *I am intending to use value stream mapping…how I'm not too sure yet.*

Interestingly 'how' the mapping technique will be used is raised as a question by the Associate and the ensuing discussion revolves around identifying potential problems: the discussion draws heavily upon the Academic Supervisor's experience of using process mapping techniques in similar environments. For example, the Associate identifies another area of the organisation for investigation but recognises that value stream mapping may not be an appropriate tool for this particular activity:

> *Value stream mapping for the shop floor certainly but I thinks it's gonna have to be, sort of I don't think I can do a value stream map for the modules or the components that go in and out and in and out and in and out because it will be a map that goes all over the place.*

The Academic Supervisor points out the possibility of using a string diagram to depict the apparently chaotic movement of component parts. This is not a technique that the Associate is aware of and a discussion around its use follows.

This brief exchange serves to identify the importance of the Associate's 'skills'. On the one hand her understanding of value stream mapping enables her to identify it as a potentially useful tool in one situation, but furthermore, to recognise its limitations and probable inappropriateness in another.

Additionally, the Academic Supervisor's skills become apparent, as he is able to identify a suitable alternative process mapping technique that is specifically used in the situation that the Associate has identified as requiring attention.

Significantly, as described in section 7.3, the organisation employs a single person to generate all of its process maps. When this person was asked to construct a simple map for a hypothetical process the resultant maps were found to contain many logical errors. This was observed result in not only deficient process maps but consequently a reluctance for other staff to follow them. As the Associate observes during the exercise where the responsible person generated a simple process map, other members of staff commented:

> *...ahh, as per one of his processes, it's over-complicated!*

In addition to identifying the Associate's and Academic Supervisor's skills as being important factors, the skills of other employees are also significant. This becomes most apparent when the Associate discusses her investigation of the supplies base and interrogates the organisation's information systems:

> *...umm I've looked at their ERP system a little coz that's another things that causes apparently a lot of problems within the company and it was only was rolled out last April and nobody really knows how to use it*

Although employees' lack of skills in using the ERP system is inferred from the Associate and has not been observed first-hand, there appear to be frequent changes to supplier schedules that are caused, at least in part, by failure to use the system correctly.

An interesting point to note is the development of one steering group that assisted with the creation of a complex process map. The Associate relates the changes in the way they discuss the maps over time:

> *I was asking them to put down what they were meant to do and by the time it got to the third meeting of trying to get this process down they were using words like decision gates*

Prior to developing the maps with the Associates none of the staff had been involved in process mapping, very few had even heard of the term. Despite this, in a surprisingly short period of time they quickly begin to use technical terminology. However, this does not seem to reflect a change in their desire to contribute to further process development. The Associate constructed another large process map and published it by sticking it to a wall in the main office. The Associate asked for people to

comment upon the map, identify any errors or suggest further improvements. After several weeks only one minor change had been made.

7.8 Summary

Process Mapping was found to be a most valuable tool in capturing the detail of business processes and as discussion and instruction documents. They were particularly useful as documents for communicating with management and for developing improvements to the business processes, and were also useful for conducting discussion and making improvements with suppliers. Interestingly, the Process Maps by themselves were insufficient to bring about changes in employees' practices. In part, this was due to a historical tension in the organisation whereby the existing process maps were considered inaccurate and over-complex by the majority of employees. Process Maps were therefore largely ignored. This is interpreted as a failure of the organisation to enforce the new Rules of work.

During the project the Associate experienced considerable frustration and an increasing lack of motivation. This was predominantly due to the relationships with other individuals within the organisation and an apparent lack of management support when attempting to complete the project objectives. It is notable that one of these persons is the Industrial Supervisor for this KTP. This became the most significant inhibitor to the performance of activity. Unlike similar situations observed in the other KTPs, since the tensions in this project existed between the Associate and management, there was no possibility of management intervening to quell the disturbances.

This KTP was notable for the reluctance of the organisation's management to consider the adoption of a great many of the project's suggestions for improvement. While a degree of resistance to change would not be surprising in such a partnership between university and commercial organisations (see section 1.4 and Skjolsvik, Lowendahl, Kvalshaugen and Fosstenlokken, 2007; Bettencourt, Ostrom, Brown and

Roundtree, 2002; Cyert and Goodman, 1997), this organisation also exhibited an unwillingness to accept the Associate's measurements and observations of its current systems and practices: section 7.1 for example, relating the organisation's view that the Associate's report was "*critical not analytical*".

This resistance to change has been the subject of debate amongst several staff of the university that had been involved with the project. The reasons for this dissonance had been stated as either a result of the KTP project failing to accurately adhere to the initial project objectives, or, as due to a fundamental problem with the organisation's management's commitment to the project and ability to undertake a programme of change. Since the project objectives had been clearly stated and agreed to in advance, and the organisation's management team had agreed to the development of detailed project objectives it cannot be said that the project did not attempt to achieve multilaterally agreed objectives. Furthermore, the organisation's reaction to suggestions for improvement were viewed as 'critical not analytical', is suggestive of a management team that were highly defensive and unwilling to effect change.

Although this level of resistance to change is highly unusual, according to the similar experiences of other KTP Supervisors within this university, it suggests that universities ought to pay attention to the nature of the organisation with whom they intend to partner. As universities continue to increase their income-generating streams, for example as the United Kingdom's government's funding of higher education decreases, there is a possibility that the financial value of a partnership takes precedence over its knowledge-generating capabilities: as highlighted in section 1.4, knowledge-intensive business services and partnerships are subject to numerous pressures that contrive to constrain and disrupt the relationship (Skjolsvik, Lowendahl, Kvalshaugen and Fosstenlokken, 2007; Bettencourt, Ostrom, Brown and Roundtree, 2002; Cyert and Goodman, 1997).

The increasing level of Associate frustration was a considerable threat to the successful completion of the KTP and demanded considerable

pastoral support from the Academic Supervisor. Such was the Associate's dissatisfaction that she terminated her contract early, though not before the primary project goals had been completed.

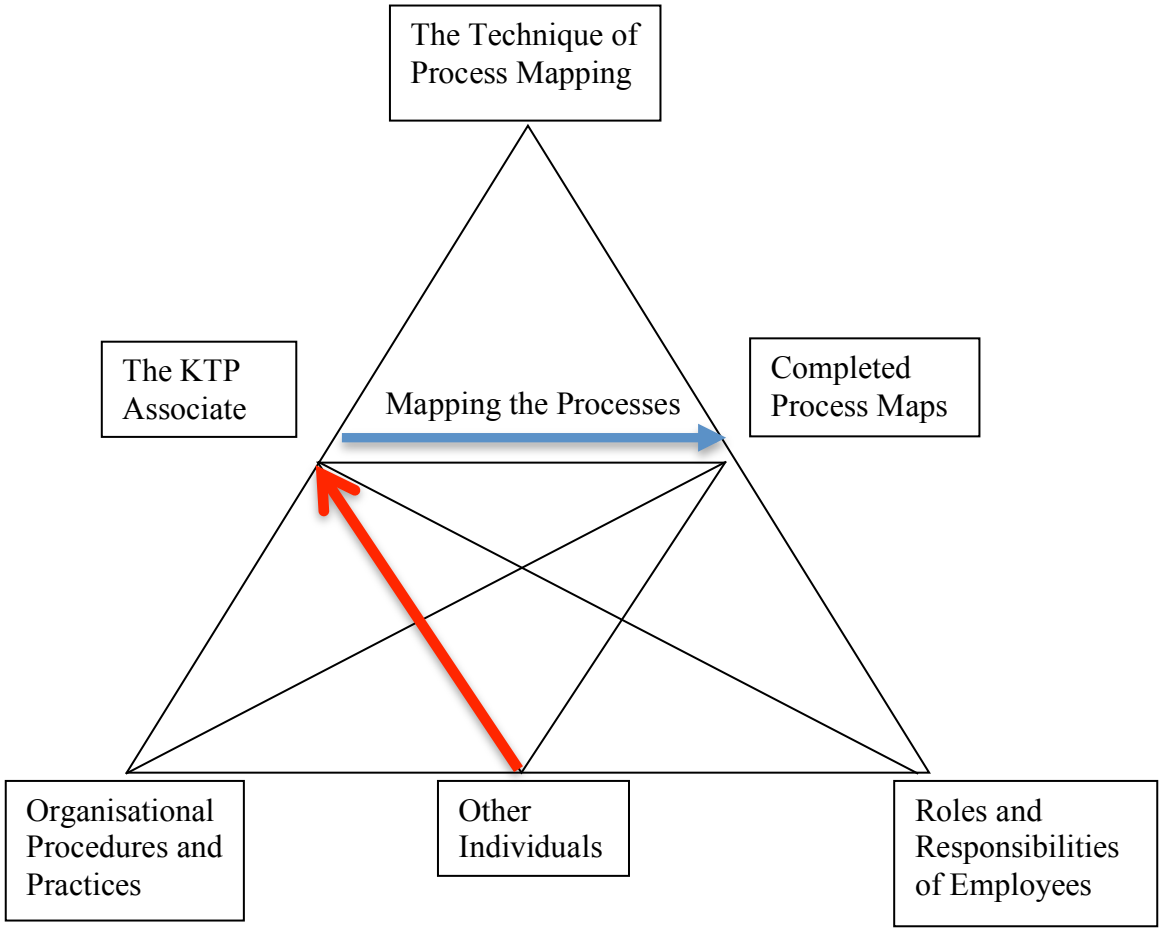

Figure 7.1 Sources of Significant Tensions in the Military KTP

8.0 Findings and Conclusion

This chapter presents the findings of the data analysis along with a discussion of the theoretical and methodological contributions of this thesis.

Section 8.1 discusses the theoretical contribution of this thesis, through the identification of an emergent element that is not explicitly acknowledged within the Activity Theory framework. The emergent element is defined and an extension of the Activity Theory framework is presented.

Section 8.2 discusses KTPs as the mechanism for the acquisition of knowledge when undertaking business process improvements. It reviews the benefits and drawbacks that Process Mapping present as a tool for the identification and development of business process improvements. It also presents a cross-case analysis of the three KTPs that were observed in this study.

Section 8.3 asserts that KTPs are not problem-free and though they are seemingly effective mechanisms for undertaking business improvements they can generate considerable anxieties in their constituent staff. It highlights the duty of the partnering and funding organisations to ensure that funds are governed appropriately. Furthermore, it emphasises the need to care for the well-being of all staff that are involved, particularly the Associate, and ensure that governance systems and supervising staff's skills are adequate to meet their needs.

Section 8.4 discusses the methodological contribution of this thesis, in adopting, and overcoming the inherent difficulties presented by, a PAR approach.

Section 8.5 outlines the suggestions for future research.

This study finds that Process Maps are most useful in capturing and disseminating knowledge pertaining to an organisation's processes and practices. Also, the motivation level of the KTP Associate is found to be a significant determinant of KTP success and is subject to considerable fluctuations, brought about by both internal and external factors. The

goals of the KTP offer a paradoxical management problem, requiring sufficient flexibility to meet changing organisational needs, but also needing to offer clear and consistent goals to the KTP Associate. The KTP Associate's relationships with other employees are a frequent tension in the working environment. Both the elements of rules and division of labour were found to be minor sources of tensions that affected the performance of the activity.

The emergent skills-related element, identified in the previous chapters, is discussed and defined in section 8.1.1. The element is termed 'Tacit Skills', recognising the differentiation between the unknowable tacit knowledge that is perceived to exist within the individual (discussed in section 2.1.1) and the observable knowledge that those individuals demonstrate when they perform activities (discussed in section 2.1.2).

The chapter finishes by making suggestions for future research.

8.1 Theoretical Contribution

Analysis of the research data (Chapters 5, 6 and 7) identified a considerable number of instances and discussions that revolved around the skills and abilities of individuals: identified through colour-coding the interview transcripts, discussed in section 4.2.4. This is an emergent factor that is not explicitly identified within the Activity Theory framework.

The Rural KTP Associate identified his own lack of skills as a barrier to completing the work toward the beginning of the project and later identifies the lack of other employee's technical skills as being both barriers to the completion of the project and a failure for the project deliverables to be sustained. Even after one new system had been in place for over six months, a lack of skills among the individual employees of the organisation were still preventing it from being utilised as effectively as possible.

The emergent element of a skills issue was also discovered through analysis of the Service KTP company's data. This manifested within the individual under observation and in the community within which he worked. The Associate identifies his own initial inability to compile

Process Maps. Over time however he reports upon an improvement in his own speed and accuracy. A lack of skills is also identified in the observation of the general poor levels of information technology abilities throughout the organisation. This was evident within employees at all levels of the organisation.

The Military KTP Associate's own lack of familiarity with Process Mapping techniques, along with the overly complex manner in which one individual in the organisation constructed the existing procedures and process maps, suggests that employee skills is a significant issue. The emergent element captures this source of tensions that conspire to inhibit the performance of activity. Additionally, there was observed to be a general lack of ability to correctly use the company's ERP system. This too could conspire to affect the ability for activity to be completed in the organisation. Over time the Associate's ability to create Process Maps improved and the importance of engaging with the relevant process owners in order to accurately construct the maps is recognised. In particular it is noted that the process owners are largely incapable of being objective and accurate when compiling the maps by themselves, but that their involvement and input is vital when the Associate is compiling the maps.

8.1.1 Defining the Emergent Element

8.1.1.1 'Skills'

Debrah and Reid (1998) point out the difficulties in developing a precise definition of 'skill' but draw upon Littler's (1982) work to identify three main ways in which it may be conceptualised. One of these is as the technical conception or foundational knowledge upon which a discipline is based. This view has however been criticised for failing to account for the tacit element of knowledge that "*may not even be apparent to the employer*" (p915). Wood (1987) also highlights the organisational context of many discussions of skill, firstly when referring to Braverman's (1974) definition of it as the inverse of managerial control: he further points out that skill needs to be defined and clarified in terms of whether it is being discussed in the context of an individual worker or a specific job, or, as

the social conception or perspective that some jobs or workers are perceived to be 'skilled', usually by other workers, or, as another form of social conception whereby the employers recognise some jobs as 'skilled' because of their strategic importance or rarity.

Wood (1987) states that skill is generally recognised to comprise three factors or debates that are different from those noted by Debrah and Reid (1998). Firstly that it is socially constructed, it contains tacit skills, and that there is a gender dimension to the subsequent division of labour. 'Skilled jobs' are argued to be those that are labelled as such by management in order to maintain power over the workforce, or alternatively as those that are labelled as such by workers to identify their "*distinct qualities necessary for the efficient functioning of industry*" (Debrah and Reid, 1998, p8). Secondly, that tacit skills are those skilled actions that are based upon individuals' tacit knowledge, "*learnt through individual experience, normally situation-specific and difficult to articulate*" (Debrah and Reid, 1998, p9). He concurs with the earlier discussions in Chapter 2 that the notion and discussions of 'explicit knowledge' transfer are poor conceptualisations of usable knowledge transfer when stating that "*simply absorbing a set of detailed instructions will not be enough to accomplish the differing elements and degrees of tacit knowledge*" (Debrah and Reid, 1998, p9). Finally, the gender-influenced division of labour that alludes to the notion that female aptitude for certain jobs is not rewarded as the same rate for jobs that require male aptitudes or characteristics (such as strength).

8.1.1.2 Tacit Skills

Ambrosini and Bowman (2001) identify the difficulties within the literature in drawing a satisfactory definition of tacit knowledge noting that "*it is important to be aware of* [the] *various synonyms*" (p812). Further discussions that they present around the nature of 'skills' also resemble those that are made of the term 'knowledge'. Like much of the literature they identify that tacit knowledge is "*difficult to write down*", that it is "*personal knowledge*", it is also "*practical*" and is "*context specific*" (p812-813). Instead they define and utilise the term 'tacit skills', as 'skills'

"*implies doing*" (p814). This reflects the adoption of the term 'knowing' in this study (section 2.1.3) and therefore the term 'Tacit Skills' is utilised to indicate the emergent element emanating from this thesis.

Similar to Wood (1987), Ambrosini and Bowman (2001) allude to a dimension of consciousness or awareness within tacit skills. Some such skills may be more easily described than others: though this, strictly speaking, is in contradiction of the term inarticulable that tacitness denotes. They do however concede that some skills at least are wholly inarticulable and remain unreachable while others are at least partly explicable. Interestingly, and in accordance with approach adopted this thesis (see Chapters 3 and 4), in order to understand tacit skills they express a preference for a research methodology that allows 'action' to be the focus of attention.

The term 'tacit skill' has become a favourable term within the literature, appearing to provide a valuable differentiation between the unknowable tacit knowledge that is perceived to exist within the individual and the observable knowledge that those individuals demonstrate when they perform activities: in this respect the term is complementary with the concept of 'knowing' or 'knowledge as doing' adopted in this thesis (see section 2.1). Cooke (2003) notes that employees' ability to engage in organisational improvement is dependant upon their "*tacit skills which they have accumulated through their on-the-job experience*" (p45) and points out that "*the ability to benefit from innovation in the future depends heavily on past experience*" (p36): this reflects the discussions in section 8.3 that highlight the importance of proper selection and training of the actors involved in KTPs to aid their successful completion. Evans, Kersh and Kontianen (2004) also note that "*tacit forms of personal competence are experiential, subjective and personal, and substantially more difficult to convey*" (p57). Reflecting the importance of knowledge to modern organisations that seek to gain competitive advantage made in Chapter 1, 'tacit skills' are said to be one of the key elements that organisations must learn to assimilate in order to sustain that advantage (Lei and Slocum, 1992).

Wood (1987) explains three dimensions to tacit skills using an analogy that is similar to the bicycle riding analogy, discussed in this thesis and elsewhere in the literature. He uses the example of driving a motor car to firstly illustrate the "*performance of routine tasks* [that] *involve a process of learning by which skills are acquired through experience*" (p9). Secondly, that some activities require different levels of consciousness to perform. And thirdly, that from an organisational perspective, work is collective and more productively performed when individuals engage in it cooperatively.

Blackburn and Mann (1979) also use the analogy of driving a motor car, noting that "*most workers use more skill driving to work than they do at work*" (Wood, 1987, p10). Wood (1987) notes, similarly to the discussion of a bicycle rider's ability to understand the act of riding the bicycle, that "*it is one thing to drive a car, another thing to be a motorist, and finally another thing to understand the mechanics of the car*" (p10). He further discusses the selection and employment of new staff and ventures that "*workers are recruited for a labour process…*[which] *may involve…the transformation of drivers into motorists or even technically aware and knowledgeable workers*" (p10).

In recognising the need to evolve workers from rule-following drones, Wood (1987) notes that management are "*responding to it with quality circles and other such initiatives*" (p10). This reflects the assertion that techniques that involve the worker in the analysis and improvement of the systems of work, typically lean tools and techniques, are recognised as means of increasing worker's tacit skills. A statement that he substantiates when stating "*formal training times, whilst important, will not tell the whole story, since much of the acquisition of knowledge is done on the job*" (p10) and that the initiation of quality circles are a "*recognition of…the tacit skills that workers have"* (p20). The use of quality and process improvement tools and techniques to improve worker tacit skills is significant since it reflects the importance of activity and experience in knowledge acquisition, and the utilisation of process mapping within this study.

8.1.2 Extension of Activity Theory Framework

The emergent element ‘Tacit Skills’ has been incorporated into the Activity Theory framework adjacent to the factor Tools (Figure 8.1). This maintains the framework and Engestrom’s insistence on retaining the activity as the focus of the study and avoiding enlarging the unit of analysis beyond the individual. It also signifies the relationship between Skills and Tool within the framework, that it is the individual’s skills that enables them, or prevents them, using the relevant tool in order to undertake the activity, and that this skill may develop over time.

It has been stated that the process maps produced by the Associates under observation in this study were of value in facilitating the future development of the organisations’ management systems. In turn, the ability of the employees within those organisations to read and understand those process maps was key to those maps being usable: in other words, their skills were determinants of the future value of the process maps. It could therefore be concluded that the element ‘Skills’ should be incorporated into the Activity Theory framework adjacent to the factor ‘Community’, thus indicating the importance of the skills of the employees in the organisation. However, as previously stated, the focus of Activity Theory is the activity that the individual is carrying out. Using Activity Theory, the effect of the element ‘Skills’ upon the other employees in the organisation could only be directly understood if the focus of the study was shifted to the activity of one other employee: for example, the activity of an employee using the process maps to further develop the business systems could be the focus of a separate study. Therefore the emergent element of ‘Tacit Skills’ is portrayed in Figure 8.1 as an element that mediates the individual’s performance of the activity.

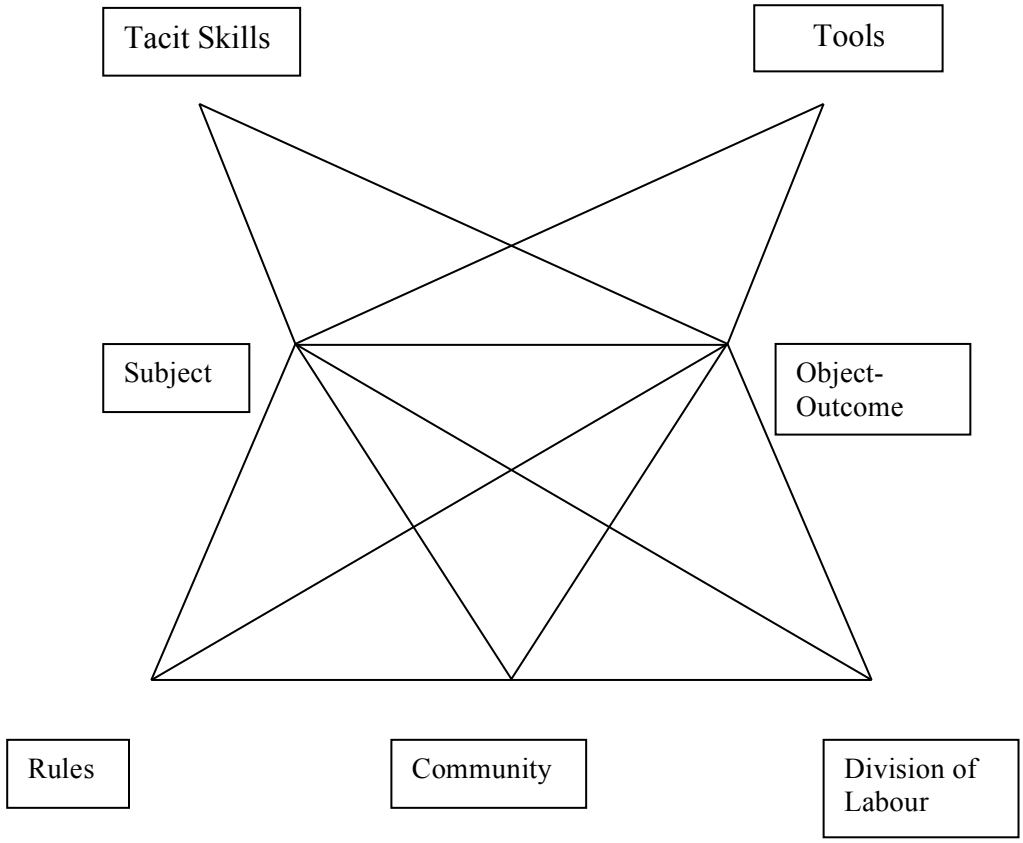

Figure 8.1, An Extension of Activity Theory

8.2 The KTP Environment

This section discusses the use of process mapping as the primary tool adopted in the undertaking of each of the three KTPs that were examined in this research. It also presents an overview of the development of each KTP over time, making comparative analysis of similarities in the KTP lifecycles.

It finds that process mapping afforded an effective means of acquiring knowledge of the key business processes along with their associated business processes. This enabled Associates to confirm or refine KTP objectives and identify productive work to undertake. Process mapping was found to be an important facilitator of socialisation that can contribute toward effective knowledge acquisition. The resultant process maps were also found to be valuable repositories of individual knowledge that could be utilised by the organisation for future process and staff development.

Despite the seemingly disparate goals of each of the three KTPs each partnership was found to exhibit a similar developmental lifecycle. Early

phases of the partnership were characterised by periods of unrest as the KTP goals were clarified, confirmed or established. This often resulted in prolonged periods of disquiet for the KTP Associate as goals and objectives were unclear and shifting: communication with the Academic Supervisor and the requirement for pastoral care were particularly high at this time. These periods were characterised by Associates being requested to undertake a variety of tasks and shorter projects, often of considerable value to the organisation, but which also occasionally resulted in considerable additions to the workload as this work was added to the KTP objectives. Middle phases were characterised by reduced communication with the Academic Supervisor as the Associates were motivated by clear and consistent goals and objectives, coupled with increased knowledge of the business, its processes and its community of other employees. The late stages of the Rural and Service KTPs demonstrated similar characteristics as the Associates became increasingly confident in their abilities, induced partly through reflection of the KTP achievements. This was observed to have a very minor negative effect upon the Associates as, on occasions, they were keen to expand upon the work they had undertaken, beyond the bounds of the KTP. The Military KTP was found to be fraught with disappointment for the Associate as the organisation was surprisingly reluctant to pursue the KTP objectives: discussed extensively in chapter 7.

8.2.1 Process Mapping for Knowledge Acquisition in KTPs

The activity of process mapping has been shown to be of considerable value as a knowledge-generating approach within Knowledge Transfer Partnership projects in a variety of organisational contexts. Undertaking the activity of mapping business processes afforded the KTP Associate a mechanism for gaining detailed understanding of each organisation's practices. Performing the activity can be seen to provide structure to the Associate's introduction to, and integration with the organisation and their subsequent acquisition of knowledge. In turn it may be construed that mapping a specific process would result in the Associate acquiring knowledge of only that process (Hicks, 2009). However, in practice, the

interconnectedness of many processes means that the Associate gains knowledge of many key processes that are common to many areas of the business: for example, many of the processes within a Finance Department interface with the budgetary and management systems of all other departments. Therefore, in gaining knowledge of the finance systems, an individual also gains knowledge of associated systems throughout the organisation.

Further to this, in conducting an analysis of the existing business processes it has been shown that the Associate will engage in socialising with the other employees. The literature shows that socialisation is an important factor in the processes of knowledge acquisition (Fernie, Green, Weller and Newcombe, 2003; Sabherwal and Becerra-Fernandez, 2003; Pfeffer & Sutton, 1999; Blackler, 1995) but does not clearly indicate the forms in which such socialisation takes place. This study has revealed socialisation taking place in two forms: at a comparatively formal level between the individual creating the process maps and the employee who is engaged with performing the business activity, and at a less formal level when the individual creating the process maps engages in extra mural attempts to forge closer working relationships with colleagues. It must be noted however that this was not observed in all cases and is therefore not a wholly generalisable conclusion, but where it was observed it was a factor that contributed to project success.

In addition to facilitating the acquisition of knowledge within the individual KTP Associate, the activity of process mapping resulted in the production of tangible assets in the form of written process maps. In accordance with Luck (2007), Ewenstein and Whyte (2007) and Keller and Jacka (1999) these were found to be highly valuable during analysis and discussion of the current business management processes with senior management and in determining areas for future business process improvement: other forms of documentation were also found to be the centre of valuable discussions, identified in the introductions to chapters 5, 6 and 7. Additionally, they were valuable as training documents for new employees. It is also evident that they are useful additions to

organisation's procedures, providing clear and concise instruction how operations are performed, and are thus valuable documents to support the acquisition of formally assessed business standards such as ISO9000, ISO14001 and EMAS.

It is important to highlight that the production of process maps was found to be insufficient, in itself, to bring about business process change and organisational improvement. Although they were highly useful in capturing knowledge about the existing process, and serving as discussion documents around which new processes could be developed, the organisation and it's constituent individuals often proved resistant to the proposed changes: as Pfeffer and Sutton (1999) noted, the problem is sometimes one of failing to take action upon available knowledge rather than a lack of knowledge itself.

The accuracy of the maps is of concern, since any errors will result in the improper development and improvement of the business management systems. The quality of the process maps was improved through cyclic development, the Associates undertaking initial investigation and map construction, followed by shorter periods of detailed investigation of more complex sections of the process.

A principle problem concerns the delegation of the activity of process mapping to individuals that are currently responsible for operating the systems being mapped. This requires those individuals to objectify their activities, their jobs, and commit their every action and interaction with business systems and other employees to paper. Since individuals use a high degree of tacit skills in their everyday work (Lei and Slocum, 1992; Ambrosini and Bowman, 2001) this effectively requires them to externalise their tacit knowledge and skills. As the literature consistently points out, externalisation of tacit knowledge and skills is not something that can be readily achieved, even if it is at all possible. This points to the need for process maps to be constructed by persons that are independent and not currently involved within the processes that are to be mapped. This enables them to adopt an objective viewpoint and uncover details that may otherwise go unnoticed.

A further concern regards the form that the activity of process mapping takes. The literature recognises that there are numerous variations of process mapping techniques, with different levels of complexity to create and understand (see section 2.3). This study has shown that some methods are too complex for many employees to be able to read and interpret. Consequently this reduces their value as training and discussion aids considerably. The decision to choose one specific process mapping technique over another must therefore not be made purely upon it's appropriateness to the nature of the business system or the problem at hand. It must also be made in light of the ability of other employees', or other users of the process maps ability to read and interpret them. It can therefore be seen that process maps may have value as knowledge-generative tools in addition to their ability to structure knowledge acquisition in the individuals that create them: see section 3.1.2 and Ardichvilli (2003). They may also have value as knowledge-generative artefacts for other individuals that have the ability to interpret them. Therefore, the choice of a process mapping technique in a form that is readily understandable by other employees may have benefits for an organisation's overall capability to acquire knowledge.

8.2.2 Cross-Case Analysis and Discussion

Each of the three KTPs employed Process Mapping as a means of producing a plan of necessary or desired improvements to the business processes. In the case of Rural, the process maps enabled the current waste management processes to be analysed for deficiencies in light of both regulatory requirements and the requirements of ISO14001 and Eco-Management and Audit Scheme (EMAS) environmental management certifications and awards. In Service, the process maps enabled the identification of duplication of work and the associated implementation of efficiency savings. In Military, the process maps enabled the current business development processes to be analysed and an improved process to be designed.

Despite the seemingly disparate goals of each of the three KTPs each partnership was found to exhibit a similar developmental lifecycle

comprising three phases. The three phases can be broadly divided into early, middle and late stages, characterised by the level of communication between the Associate and the Academic Supervisor, the clarity of KTP objectives and the Associate's level of motivation.

The early phase of all three KTPs was characterised by very high levels of communication between the Associate and the Academic Supervisor: details of the frequency and nature of communications are discussed in the introductory paragraphs of chapters 5, 6 and 7. The degree of communication appeared to be related to the Associates' frustrations at the lack of clarity of the KTP goals and objectives. Although each KTP was launched with seemingly well-defined objectives, the finer details, including for example what other staff else would be involved in resourcing the efforts, often resulted in frustrating delays for the Associates. During this time the Associates required reassurance that the delays were not a reflection of their own performance. Providing other shorter projects for them to undertake were found to be valuable, both in delivering unplanned benefits for the organisation and also for improving the Associate's understanding of the organisation, its processes and other staff: Rural KTP added the development of an online customer booking system, Service KTP added the implementation of revised software in Human Resources and Finance departments, and the Military KTP added the creation and delivery of 6-sigma and DFA/M workshops with the organisation's key suppliers.

The middle phase of all three KTPs was characterised by similar reductions in the level of communication with the Academic Supervisor: future research may explore how the KTP Associate's communication with other individuals fluctuates during this time. As the KTP objectives and details became clearer, and the Associates' familiarity with the organisation improved, so they improved in their ability to carry out the necessary work with less support and reassurance. It is notable that in some instances the valuable shorter projects that had been introduced in the early phase were found to continue for considerable periods of time. These were occasionally found to become minor disturbances as they

contributed to rapidly increasing workloads: in particular, short projects to implement software improvements and manpower planning systems in the Service organisation were considerable additions to the planned Associate workload.

The later phases of the Rural and Service KTP were characterised by similar changes. Both Associates were observed to be keen to increase their remit and make further business improvements beyond the original scope of the KTP. This was both encouraging to observe, as the Associates' skills and abilities were expanding, but also contributed a minor source of tensions as their efforts were restricted to focus upon achieving the primary objectives of the KTP above other benefits. The later phase of the Military KTP however was found to exhibit markedly different characteristics. As discussed throughout chapter 7, this KTP was beleaguered by an apparent lack of management support when attempting to complete the project objectives. Toward the end of the KTP the Associate became increasingly frustrated at being unable to have achieved all of the stated objectives of the KTP: once again, Associates were found to feel personally responsible for delivering a successful KTP and experienced great frustration and anguish when prevented from doing so.

In summary, despite pursuing very different goals and objectives in each of the three KTPs, with organisations that operate in different commercial environments, each was found to progress through similar phases of development. The KTP Associates underwent similar periods of frustration and motivation, coupled with differing degrees of communication with the Academic Supervisor and requirement for emotional support. It is not entirely clear to what degree this similarity in development is due to the format of the KTP initiative, or may be in some way due to the use of the process mapping tool or other factor.

8.3 Governance of KTPs

This section asserts that KTPs are not problem-free and though are seemingly effective mechanisms for undertaking business improvements

they can generate considerable anxieties in their constituent staff. It is not the purpose of this thesis to evaluate the effectiveness of the KTP scheme, but each of the three KTPs was found to deliver a range of valuable business process improvements. Largely these were in line with the original intended outcomes of the partnership. More importantly, this research has identified three themes that were problematic and common to each KTP; Associate Integration, Partnership Objectives and Associate Motivation.

8.3.1 Associate Integration

One of the immediate issues that face KTPs is the integration of the project Associate with the partner organisation. Even though the Associates underwent formal induction programmes these were insufficient by themselves to fully immerse the individual with the organisation. All three Associates that were the subjects of this study relate the tensions that surrounded their introduction to the company and the difficulties this presented. Over time though, some Associates are capable of socialising with other members of staff and forging relationships that reduce the workplace tensions.

8.3.2 Partnership Objectives

All three KTP projects identified a period of flux when the objectives of the partnership were changed or modified. This was often a period of considerable tension for the Associates who, without clear and stable goals, found it difficult to progress the project and often became demotivated and frustrated. Undertaking the activity of process mapping was found to be an effective way of gaining knowledge of the organisation and its operations, knowledge that subsequently informed the development of clear project goals: most notably discussed in section 6.3. In constructing the process maps the Associates gained knowledge of the organisations' systems and working practices and also interacted with the other members of the organisation, thus facilitating the development of closer working relationships and reducing workplace tensions. Process mapping therefore provides a relatively simple approach to integrating the Associate with the organisation and of

generating potentially valuable knowledge that may aid the development of the project objectives and the realisation of the partnership deliverables.

8.3.3 Associate Motivation

Each KTP underwent a period of time, in some cases a considerable portion of the overall project duration, where the Associate experienced a great degree of frustration and demotivation. The sources of frustration ranged from a lack of clear and stable project objectives to internal resistances to change. During these periods the Academic Supervisor was called upon to provide significant levels of pastoral care. Although the Associates' supervisors may be expected to provide a degree of mentoring and technical support the demands made upon the Academic Supervisor to provide pastoral support could be considerable when the Associate faced tensions with their Industrial Supervisor and other colleagues.

It is pertinent to reflect upon the discussion in section 1.5 and the university communication shown in Appendix E that, in this researcher's view, advertises but trivialises the benefits of KTPs to university staff. KTP supervision has been shown to be not merely a clerical or administrative role, it requires understanding of the partnering organisation's technologies and management culture as well as a considerable degree of pastoral support. Not all academic staff may have the necessary combination of skills and experience to lead KTPs successfully, furthermore, failure to provide appropriate pastoral support could be considered to be a failure in the partnership's moral obligations to the Associate that has been employed. The conclusion of this study confirms the assertions made in section 1.5 that academic staff require careful selection, training and support in order to be effective KTP supervisors.

8.3.4 Implications and Responsibilities within KTPs

As discussed in Chapter 1, KTPs are part-funded initiatives utilising government funding to facilitate partnerships between universities and

small to medium sized enterprises. As such, the funding and partnering organisations have a responsibility of stewardship to what are essentially public funds. While it is not the purpose of this thesis to evaluate the effectiveness of the governance of KTP funds, the findings of this study suggest that systemic organisational resistance, not necessarily the resistance of individual employees, can be a pertinent inhibitor to the achievement of KTP objectives: see specifically Chapter 7. This particular project was notable for the reluctance of the organisation's management to consider the adoption of a great many of the project's suggestions for improvement. While a degree of resistance to change would not be surprising in such a partnership between university and commercial organisations (see Skjolsvik, Lowendahl, Kvalshaugen and Fosstenlokken, 2007; Bettencourt, Ostrom, Brown and Roundtree, 2002; Cyert and Goodman, 1997), this organisation also exhibited an unwillingness to accept the Associate's measurements and observations of its current systems and practices: for example, relating the organisation's view that the Associate's report was "*critical not analytical*" (section 7.1). Consequently, government and funding partners should be mindful of organisations that fail to adequately support the achievement of the objectives for which funding has been secured.

In each of the three KTPs that were studied, the Associate was found to undergo considerable emotional turmoil. This was the result of several different factors: the lack of clear goals, or competing and changing goals, was found to induce short-term anxieties within each Associate, whereas a lack of support to achieve the KTP objectives however, was found to induce longer periods of anger and frustration, and in some instances, resulted in the Associate resigning their position or taking sick leave.

Clearly, some degree of uncertainty around KTP objectives will exist at some point in time. All of the Associates were accepting of these situations. Prolonged periods of indecision however reduce the remaining time that is available to achieve the aims of the KTP and adversely affected the Associates.

Not only did this result in a reduction in the Associates' motivation and level of performance, but also it had a significant deleterious effect upon their psychological well-being. The Academic Supervisor was frequently called upon to provide pastoral care and emotional support beyond that which they are required to provide in their every day role as a university Senior Lecturer. Although the Associates' Supervisors may be expected to provide a degree of mentoring and technical support, the demands made upon the Academic Supervisor to provide pastoral support can be considerable when the Associate faces tensions with their Industrial Supervisor and other colleagues. This suggests that the choice of Academic Supervisor for a proposed KTP should take into account the abilities of the supervisor to provide such pastoral support as well as their technical or experiential credentials. Furthermore, academic staff that undertake KTP supervision should be appropriately trained in providing such support, and that the university takes reasonable precautions to monitor the emotional well-being of the Associate and Academic Supervisors that they employ.

8.4 Methodological Contribution

This section reviews the methodological contributions to research practice made by this thesis. As stated in section 1.6, this thesis has not identified any previous studies of the processes of knowledge acquisition that exist within KTPs, nor any examinations of the challenges that KTPs present to the partnering organisations or the individuals involved in their execution: a single study used a KTP as the context for research into cultural barriers to change (Losekoot, Leishman and Alexander, 2008).

Chapter 4 detailed the research strategy adopted within this study that comprises Participatory Action Research (PAR), employing multi-site triangulation and cyclic data capture and analysis over an extended period of time. The adoption of PAR (Whyte, 1989) reflects the nature of this study where the researcher was also the Academic Supervisor for the KTPs, and also the concept of knowledge and research framework that were adopted. Other forms of Participant Observation exist that require either full involvement of those being studied in the research process, or

the blending of the researcher with the field of study. Since the researcher was an ‘active agent’ of the KTP process it was not feasible to blend into the field of research, and neither was it desirable to involve the actors being researched in the research process in order to maintain impartiality.

Future studies of KTPs may be undertaken by researchers that are not directly involved in the KTP process. It may be possible for those researchers to adopt alternative research strategies that offer new insights into KTPs. However, the subtle complexities of the KTP environment, such as the Associate’s psychological well-being, require total immersion in the process and a position of some considerable trust with the Associate in order to uncover them. Those aspects of the KTP may go unnoticed by a researcher that is attempting to blend into, or be removed from, the research field.

The use of multi-site triangulation (Eden and Huxham, 1996; Miles, 1979), across three KTPs in dissimilar organisations but using similar approaches for the performance of work, improves the reliability and validity of interpretive enquiry (Jick, 1979; Miles, 1979) and that of Action Research (Gronhaug and Olson, 1999). The researcher’s involvement in a growing number of KTPs afforded the opportunity to select research sites that were complementary to the study. This opportunity is unlikely to be available to those researchers that are not involved in numerous KTPs; researchers that are affiliated with academic institutions, funding partners or government, may however be in a position to replicate this approach.

Cyclic data capture and analysis is also an approach that improves the reliability and validity of interpretive enquiry (Bositis, 1988; Miles, 1979; Sanday, 1979; Becker, 1958). Additionally, declaring and demonstrating the research process is seen by some as a prerequisite for the development of ‘good theory’ (Nixon, 2004; Llewelyn, 2003; Weich, 1989) and improves its contribution to theory (Whittemore, Chase and Mandle, 2001) - Checkland and Howell (1998) use the term ‘recoverability’ to refer to the generalisability of findings to other instances. The cyclic

development of research questions, based upon analysis of the previous data that has been captured, enabled the researcher to pursue emergent and interesting themes and to discount irrelevant or non-productive lines of enquiry. Additionally, it was the unavoidable means by which valuable researcher reflexion took place (Schwartz and Schwartz, 1955) but avoided the pitfalls of narcissism that deliberate reflexivity can result in (Maton, 2003; Skoldberg, 1998).

The use of Activity Theory as the research framework provided a beneficial structure for the data capture and analysis. The individual elements of Activity Theory provided a theme around which research questions were constructed and the resultant data was analysed. Although interesting and emergent themes were operationalised during the research process, this framework contributed to the efficient capture and analysis of data.

Undertaking the investigation over an 'extended period of time' is a requirement of Activity Theory (Engestrom, 2000b; Blackler, 1995) and of forms of Action Research in order to become immersed in the research field. This places considerable demands upon the researcher that aims to build trustworthy relationships with KTP actors, particularly if multi-site triangulation is employed and those sites are being investigated concurrently. Qualitative data is often extensive and analysis is resource intensive (Miles, 1989), and care must be taken to ensure that the researcher is not overburdened, especially when undertaking cyclic data capture and analysis along with the development of further research questions. There appears to be little guidance as to how long is 'an extended period of time'. The point of theoretical saturation is deemed to be an appropriate point to cut-off the investigation (Guest, Bunce and Johnson, 2006; Glaser and Strauss, 1967). Researchers of KTPs however, must be mindful of the fixed timespan that they exist and all data capture will need to be completed within the timeframe of the KTP.

Summary of methodological contributions:

1 Adoption of PAR as a research strategy:
This approach acknowledges the researcher and the research participants as active agents of the KTP being studied.

2 Use of cyclic data capture and analysis:
This enables the researcher to follow emergent or valuable lines of enquiry and contributes to improvement in the quality of interpretive study.
It also incorporates a mode of valuable reflection that does not require further operationalisation.

8.5 Suggestions for Future Research

Future research should begin by confirming the findings of this thesis. This study may be replicated to investigate KTPs conducted between other universities and their partnering organisations.

Observing KTPs from the perspective of other actors that are involved may make further valuable contributions. Performing this study from the perspective of the Industrial Supervisor's, KTP Adviser's or KTP Associate's viewpoint are likely to provide useful insight.

Studying the process of knowledge acquisition within KTPs by adopting a collectivist approach may also prove fruitful and potentially confirm the findings of this study through methodological triangulation.

This thesis has raised the issue of KTP Governance as being important both for the success of KTPs and particularly for the Associate that is employed, but also in terms of the wider implications for the scheme itself. Future research should investigate the governance mechanisms that are in place at the level of the individual KTP and at the level of the governing and funding bodies.

KTPs are effective mechanisms for generating organisational change. Being an under-researched area they may offer new insight into change management practice and effects. This thesis suggests that KTPs may

afford opportunity to explore organisations' cultural, as well as individuals', resistance to change.

Future studies may also examine similarities in the lifecycle, or phases, through which KTPs develop.

9.0 References

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APPENDIX A

Semi-Structured Interview Question Development

The importance of showing the cyclic process of question development is key to a Participatory Observation research strategy (Becker, 1958). The degree of 'recoverability' of qualitative research is also improved when the method is declared in advance (Gronhaug and Olson, 1999).
This section discusses how the research questions were developed over the course of the investigation to more specifically explore significant factors and emergent issues.

A1.0 Initial Questions

A1.1 'Tools' and 'Object-Outcome' Interview Questions

These two categories had been combined since the objective of the initial stages of the projects, to map the processes, is the objective of the lean technique that had been employed as the tool, namely process mapping.

These questions were developed to explore the Associates' understanding of the lean tool being implemented or used, namely process mapping. The questions for the Rural Associate reflect the interviewer's significant prior experience of the organisation acquired through previous involvement with collaborative KTP projects. The questions for the Service and Military Associates reflect the fact that the initial interview was undertaken during the early stages of the project.

Rural Questions:

How have you arrived at this point?
How did you record all the process information?

Service Questions:

How are we going to achieve our aims?
So this process of mapping, what is it? Or how do you do it?
How do you find the mapping process?
How useful is the process mapping method?
Is there a better way of mapping the process?

Military Questions:

How are you intending achieving this goal of the project?

A1.2 'Subject' Questions

This question explores the reasons and motivations for undertaking the activity. In addition to the work-based motivations (or instructions) to perform the activity this question provides opportunity for the interviewee's own motivations to be explored, either voluntarily or through further questions.

Common question for all Associates:

Why are we trying to do this?

A1.3 'Object-Outcome' Questions

This question explores the Associate's understanding of the objective or end-goal of performing the activity. The questions for the Rural Associate reflect the fact

that the initial interview was undertaken after the first process maps had been constructed.

Rural Question:

So how did you identify which processes or process to begin with first, or to try and map?

Service Questions:

What are we trying to do?

Military Questions:

Tell me about your KTP at Military, what are you doing?
If you had to sum up the ultimate project aim what would it be?

A1.4 'Community' Question

This question explores the Associate's interface with other individuals within the organisation. It endeavours to uncover any personal or work-based tension in relationships.

Common question for all Associates:

Tell me about [person or people]

During the interview [person] was replaced with the name of a specific person with whom the Associate was working closely.

A1.5 'Rules', 'Community' and 'Division of Labour' Questions

These questions were grouped together for the initial interviews since it was envisaged that there would be insufficient knowledge of the detailed working practices that would enable more specific questions to be posed.

Common question for all Associates:

How would your project be affected if [person] left?
What issues do you have?
What constraints are there upon the project?

Once again, during the interview [person] was replaced with the name of a colleague or other significant member of the organisation that was involved with the KTP.

A2.0 Development of Questions for Rural Organisation

A2.1 Rural Emergent Questions after Interview in May 2008

Apparent tensions between project member, Person 1 and Person 2 –

Has [person's] attitude changed over the last few weeks?
How do Person 1 and Person 2 get on now?
Has there been any change in the relationship between Person 1 and Person 2?
Does [The Chief Executive] still get involved with the relationship between Person 1 and Person 2?

AND,

Recognising the socialisation that occurred between the project member and Person 2 –

Are you still having your casual outside chats with Person 2 while she has a cigarette?

Have you had any casual outside chats with Person 1?

AND,

That Person 2 announced her support for the project last time but might not have been entirely truthful or convinced –

Has Jo maintained her enthusiasm for the project?

To see if the approach to process mapping has been changed/improved in any way -

How do you capture information about the process?

Have you changed the way you capture the information about the process?

Recognising that information tended to be gathered very informally (a process of socialisation) -

Are you still uncovering information by chatting with people or do you have more formal sessions?

AND,

That people's attitude toward the project may change over time (they were perceived as being "protectionist") and that previously the project member had received "comments" about what he was doing -

Are people more or less forthcoming with information now?

Are there any new constraints upon the project since we last spoke?

Recognising the demotivating effect that lack of progress had upon the project member and the IT expert –

Are you still motivated?

What have you found most motivating or encouraging over the last few weeks?

What have you found least motivating or most discouraging over the last few weeks?

A2.2 Rural Emergent Questions after Interview in November 2008

Apparent tensions between Person 1 and Person 2 -

How are Person 1 and Person 2 getting along?

How do you get on with Person 1?

How do you get on with Person 2?

AND

Recognising the socialisation elements -

Are you having your casual chats with Person 2 or anybody else?

People's willingness to raise and discuss issues –

Are you broaching problems and issues more directly with people rather than going through [the Chief Executive]?

Is everyone else being more direct or are they still 'going round the houses'?

Support for the project -

Is Person 2 still supporting your project?
Is the general support for the project still there?
How is the Chief Executive supporting the project?
Are the important project members in place to achieve EMAS?
What does the rest of the organisation think of the EMAS project?
Are some departments more or less supportive than others?

Technical and training issues -

Is Person 1 more technically competent now?

General motivation issues -

Are you still motivated?
How about everyone else, are they motivated?

The general approach -

Are you still utilising the process mapping approach?
Have you managed to move on from the Booking Process or are you still looking after it?
Are you still aiming to keep the procedures 'workable' or have they become more formal?
Have you done any more process maps?

A2.3 Rural Emergent Questions after Interview in March 2009

Apparent tensions between project member, Person 1 and Person 2 –

Has [person's] attitude changed over the last few weeks?
How do Person 1 and Person 2 get on now?
Has there been any change in the relationship between Person 1 and Person 2?
Does the Chief Executive still get involved with the relationship between Person 2 and Person 1?

AND,

Recognising the socialisation that occurred between the project member and Person 2 –

Are you still having your casual outside chats with Person 2 while she has a cigarette?
Have you had any casual outside chats with Person 1?

AND,

That Person 2 announced her support for the project last time but might not have been entirely truthful or convinced –

Has Person 2 maintained her enthusiasm for the project?

To see if the approach to process mapping has been changed/improved in any way -

How do you capture information about the process?
Have you changed the way you capture the information about the process?

Recognising that information tended to be gathered very informally (a process of socialisation) -

Are you still uncovering information by chatting with people or do you have more formal sessions?

AND,

That people's attitude toward the project may change over time (they were perceived as being "protectionist") and that previously the project member had received "comments" about what he was doing -

Are people more or less forthcoming with information now?

Are there any new constraints upon the project since we last spoke?

Recognising the demotivating effect that lack of progress had upon the project member and the IT expert –

Are you still motivated?

What have you found most motivating or encouraging over the last few weeks?

What have you found least motivating or most discouraging over the last few weeks?

A3.0 Development of Questions for Service Organisation

A3.1 Service Emergent Questions after Interview in May 2008

Apparent tensions between Project members and Person 1 -

How is your relationship with Person 1?

Have you spoken to Person 1?

Have you approached him or has he approached you?

What changes or improvements has Person 1 made since we last spoke?

Since the first interview the organisations has lost a significant proportion of business with its key customer-

How has the project changed lately?

Has the project been affected by the recent loss of business?

Ongoing relationship between project members, especially since Person 2 commented that the Associate "tells me what to do…a lot!"-

Person 2, how do you get on with Person 3?

Person 3 how do you get on with Person 2?

Since people thought that the project was "looking into….not doing" -

Have people's perceptions of what you are doing changed?

What have you accomplished in the last month?

From emails it is apparent that making appointments with some heads of departments is particularly difficult (HR failed to turn up to one appointment while I was there) –

Which people are you still waiting to see?

Who has it been most difficult to arrange to meet?

Did they explain why they could not make your appointment?

Why do you think they are difficult to meet?

A3.2 Service Emergent Questions after Interview in July 2008

Apparent tensions between Project members and Person 1 -

How is your relationship with Person 1?
Have you spoken to Person 1?
Have you approached him or has he approached you?
What changes or improvements has Person 1 made since we last spoke?

Since the first interview the organisations has lost a significant proportion of business with its key customer-

How has the project changed lately?

Since people thought that the project was "looking into….not doing" -

Have people's perceptions of what you are doing changed?

From emails it is apparent that making appointments with some heads of departments is particularly difficult (HR failed to turn up to one appointment while I was there) –

Which people are you still waiting to see?

Links with Stuart from the university and Roll Activity Diagrams –

Have you seen Stuart?
Did you invite him to come down?
Was it helpful?

Exploring changes in the way that process mapping and RADs are used –

Have you changed the way in which you do process mapping and Roll Activity Diagrams?

Employees are involved in confirming the accuracy of process maps and RADs, just to ensure that they are accurate –

Are you still requiring employees to amend the maps in any way?
Have you found any of their previous amendments to be inaccurate?

Investigating the relationship with Person 1 and his tendency to be 'chatty' –

Is there a general level of chatter in the organisation that you find annoying or disturbing?
Does Person 1 still chatter?

A3.3 Service Emergent Questions after Interview in August 2009

Recognising the continued difficult commercial environment –

How has the project changed lately?
Has the project been affected by the recent loss of business?

Also, how people's perceptions of the project have changed –

Have people's perceptions of what you are doing changed?
What have you accomplished in the last month?

And the continued difficulties with specific members of staff –

How is your relationship with Person 1?

A4.0 Development of Questions for Military Organisation

A4.1 Military Emergent Questions after Interview in April 2010

Recognising the need to document the existing processes and provide procedures and instructions for new processes:

Have you chosen a specific process mapping technique or approach?
Have you mapped any processes?

Recognising the complexity of the project and the large number of separate sub-projects that it includes:

Have you finalised the project goals and objectives?
Have they been agreed with Military?
Have they been communicated to everybody?

Recognising the high degree of resistance to change:

Do you still find people resistant to change?
Are people giving you and your project more support?

A4.2 Military Emergent Questions after Interview in June 2010

Recognising the difficulties that are faced gaining support for the project from management -

Have you overcome the problem of people being reluctant to provide input to your process maps?
If not, how are you going to overcome this problem?

Is there any particular individual that causes you problems or difficulties?

A4.3 Military Emergent Questions after Interview in February 2011

Again, recognising the difficulties that are faced gaining support for the project from management -

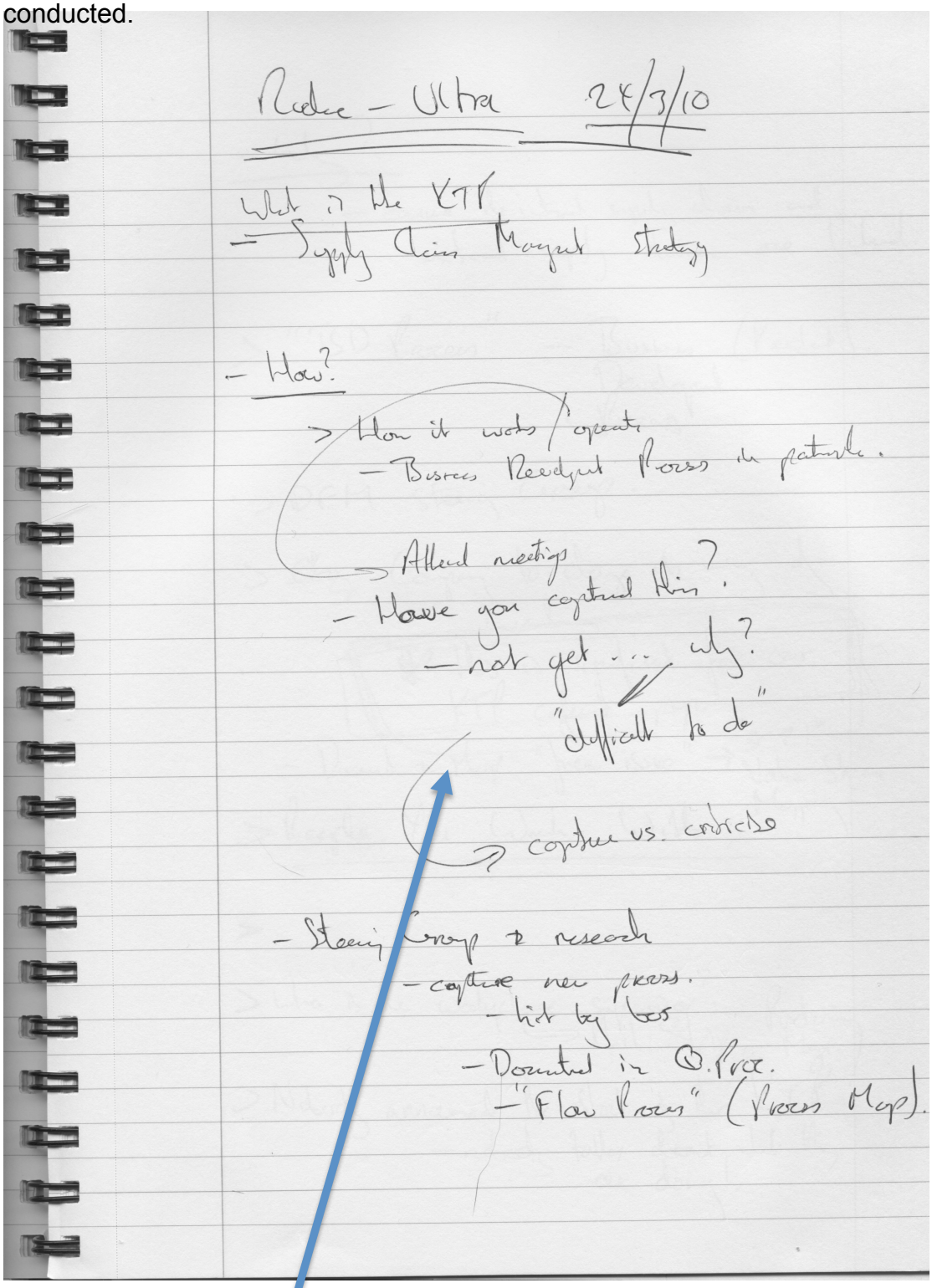
Do you have better management support now?

Clarifying the project goals –

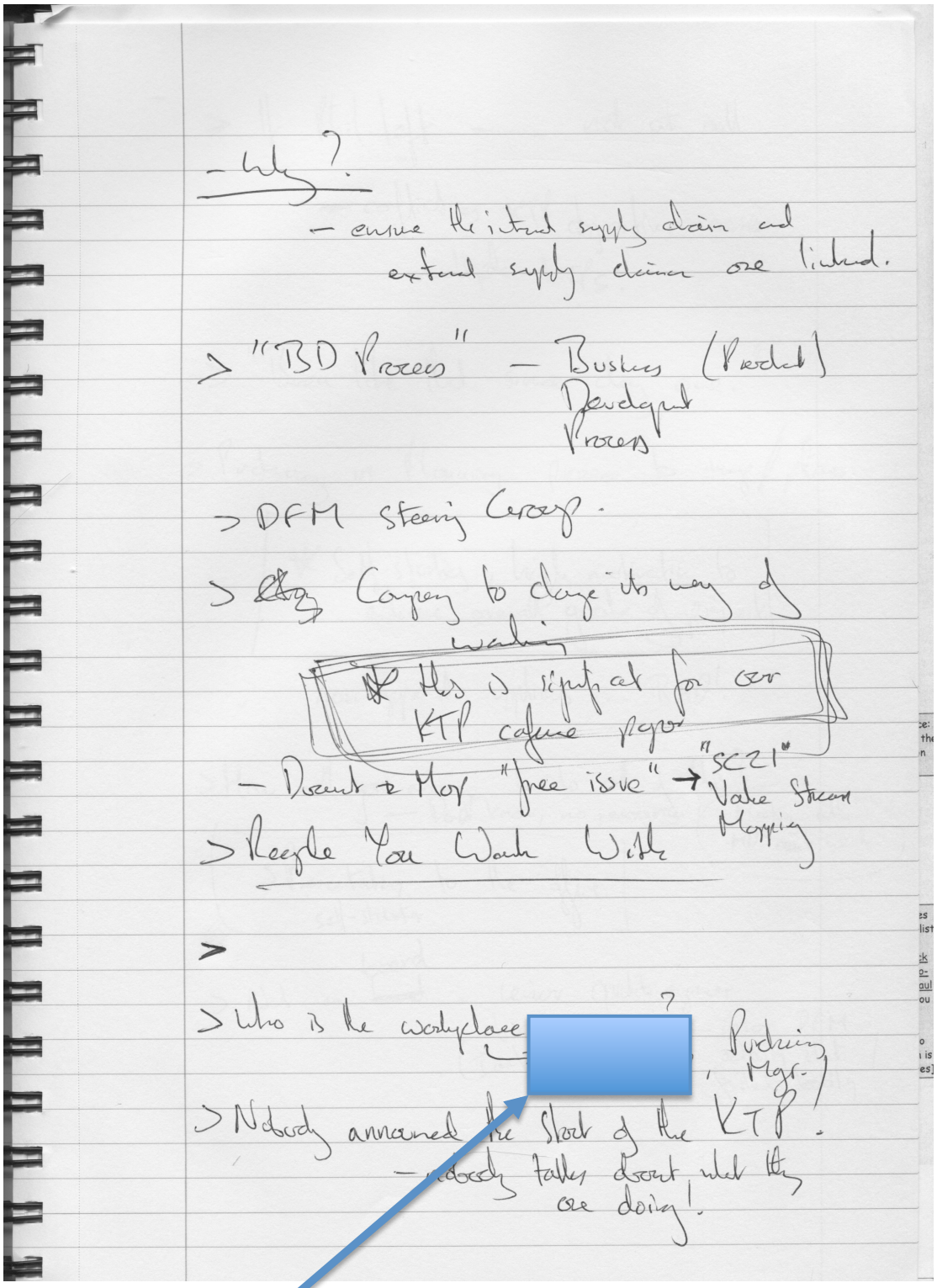
What do you think the project has achieved?
What could it have done better?
Did the project succeed in fulfilling its objectives?
How useful was Process Mapping as an approach to business systems development?

APPENDIX B

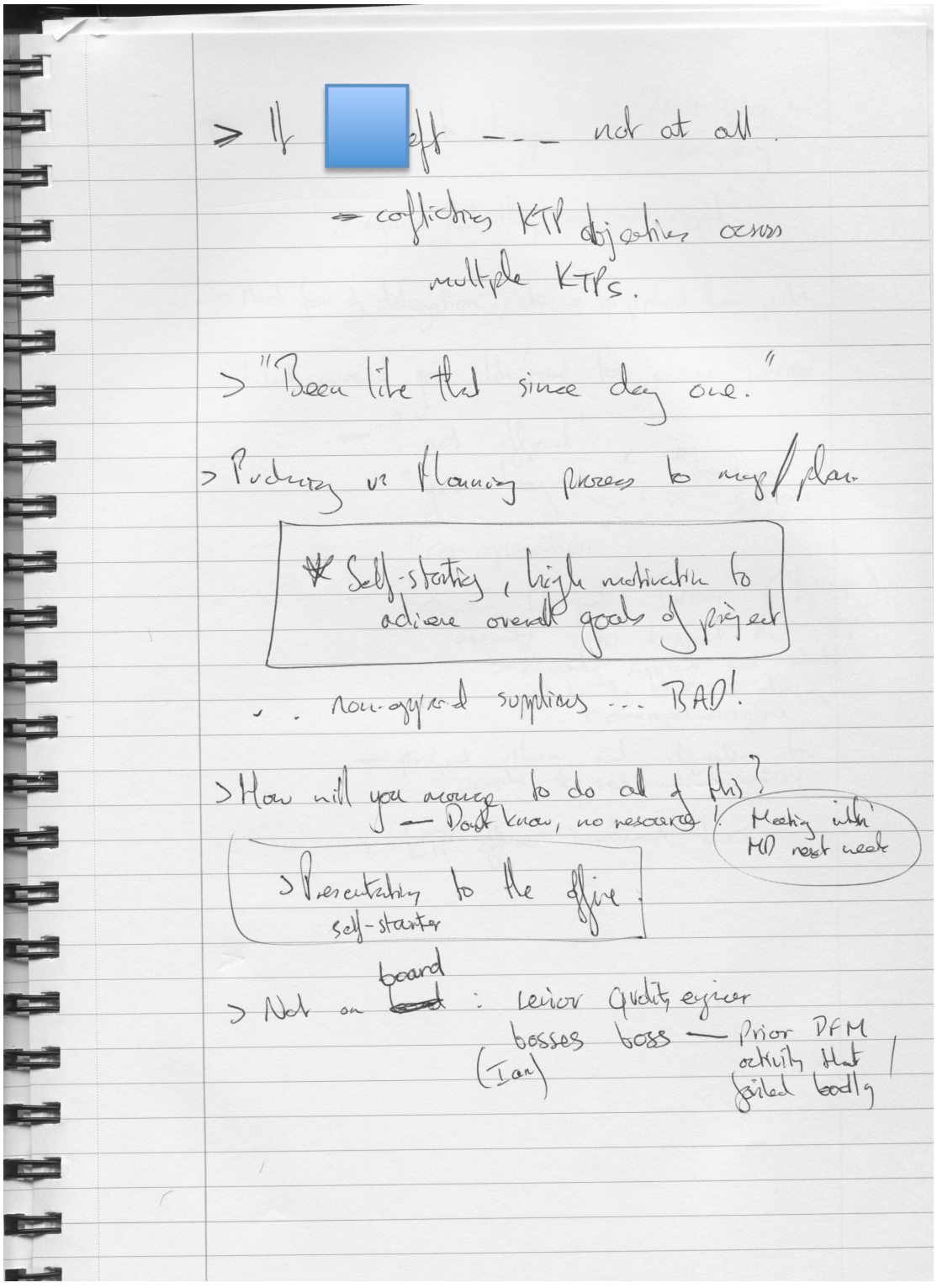
Example of instantaneously-sampled field notes compiled during a site visit to Military organisation on 24/3/10, prior to interviews being conducted.

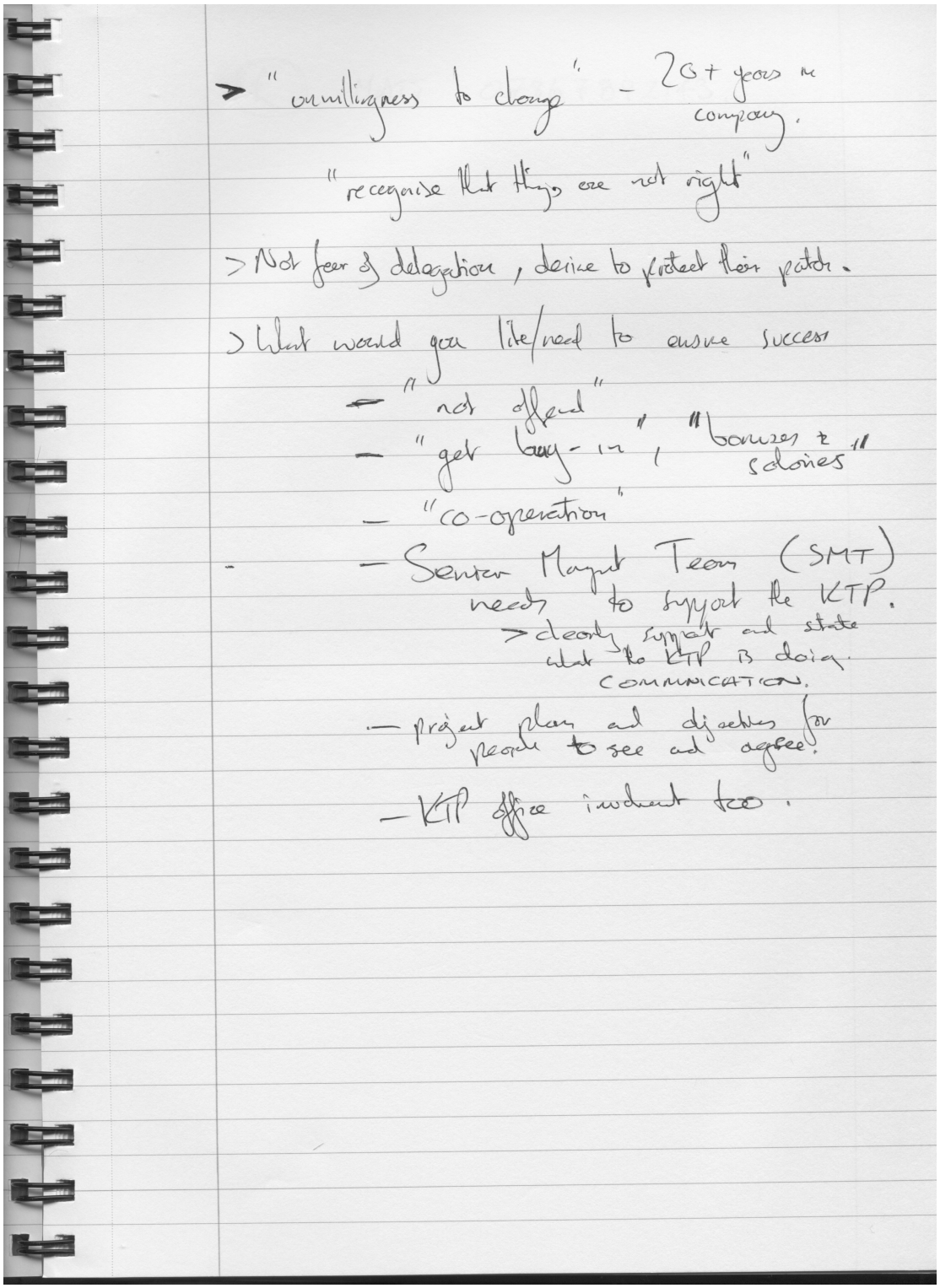


Note:
these comments reflect the discussion of this KTP made in section 6.3 that the activity of process mapping did not take place at the commencement of the project.



Note:
Boxes added to anonymize members of the organization.


> [redacted] eff --- not at all.
=> conflicting KTP objectives across multiple KTPs.
> "Been like that since day one."
> Pushing vs Planning process to map/plan
* Self-starting, high motivation to achieve overall goals of project
. . non-aligned suppliers ... BAD!
> How will you manage to do all of this?
— Don't know, no research!
Meeting with MD next week
> Presentation to the office
self-starter
> Not on board : senior quality engineer bosses boss — prior DFM activity that failed badly
(Ian)


> "unwillingness to change" - 20+ years in company.
"recognise that things are not right"
> Not fear of delegation, desire to protect their patch.
> What would you like/need to ensure success
- "not offend"
- "get buy-in", "bonuses & salaries"
- "co-operation"
- Senior Mgmt Team (SMT) needs to support the KTP.
> clearly support and state what the KTP is doing.
COMMUNICATION.
- project plan and objectives for people to see and agree.
- KTP office involved too.

Appendix C

This appendix presents a sample of interview transcript that has been colour coded to indicate those areas of discussion that relates to the theme of TOOLS within Activity Theory.

The researcher's questions are highlighted in **BOLD** text.
The transcript also contains the researcher's notes, made during the transcribing process, that acted as *aid memoirs* for the subsequent analysis and development of future interview questions.

Military Interview 16th February 2011

Thematic Colour Coding:

Tools	YELLOW
Subject	GREEN
Object	BLUE
Rule	ORANGE
Community	MAGENTA
Labour	PINK

Why do you get migraines?

No idea

Why do you think you're having them more frequently now?

Cos Im not sleeping

Why are you not sleeping

No idea

More stressful at work

I cant turn my mind off which the doctor said was a form of stress but Ive always been like that…I cant stop my mind going

So it doesn't appear to be linked to anything that's happening at the moment with work or the project it's just one of those things

Yeah

OK that's good.
Are you sure?

Im sure it would be less stressful working somewhere else but I am looking elsewhere.
Im not sure if they know that or not, theyd be stupid not to

So they probably don't know?

Well they probably do because Ive chatted about it in the office with my colleague who's also looking for a job

Ahh.
Are many people looking for jobs elsewhere?

Only the ones with ambition.

[Anonymised] has left as well..or not had his contract renewed.

I think it was the latter.

Have the process maps you made been of any use?

Not really

Why is that?

I tell a lie actually, the one that I did for the supplier [name anonymised] they've, weve redone it as a new process umm and they've eliminated some of their wasted time such as the Operations Director going and moving a rod from one rack to another and they were checking stock three times so that's all been eliminated the wasted time and duplicate activities and now we're going through more detail and breaking it down into the inspection process.

Right.
So its worked at the supplier, why hasn't it been of any value at Military?

Umm there's lots of processes already there and if you have our quality management guy in a room he will quote the numbers of them off the top of his head, which is just infuriating because noone follows them.
So in all honesty Ive not presented a new business development process yet. Umm I need to do that, that ones just gone on the back burner cos everything else is sort of…well it wouldn't get followed anyway so it, it sort of, that doesn't sort of encourage me to spend hours going through stuff and putting this process together because they wont use it anyway because they'll go [verbally and physically emphasises the next quote "we need to get it to market really quickly" and it'll just be pushed through by the marketer who's a bit of an arrogant git, and I mean he doesn't even [laughs] the oxygen generator that they've been working on for god knows how long umm when I was actually umm off work I was watching tv, I had a day's leave or something I can't remember what it was, and umm it had an oxygen concentrator on the news for use in the defence market.
So I emailed him and said 'have you seen this, its on BBC1' he saw it and went "ahh but they're still 18 months from market"…"I'm not sure they are [anonymised name] when they're on the national news" you wouldn't think theyd go on the national news 18 months prior to being anywhere near to market, "how's our FDA approval going?" [mimicks a dull voice] "oh, we haven't started it yet"

But theyre very, theyre in denial, they like to sort of push things through quickly and think theyre coming up with the most unique idea in the world and theyre really not…and their very blind-sighted and they know they need to get into new products and I think the older generation who have known the [anonymised product name] in depth half of the engineers are waving their arms in the air going "this is not dead" and the others who are, the managers certainly and the senior managers know that they've got to get new products are sort of putting all their faith in their development team which consists of three people, one of whom has no imagination, one of whom he has a lot of imagination but he also wont take no for an answer he will push things through even if they are not a very good idea…and, I don't know, that's just my personal opinion obviously but it's, sort of nothing has come to fruition yet and Ive been there over 18 months now… they are just getting some working prototypes.

I thought last time that you mentioned that you had a group of the managers together and theyd started to map stuff and they were starting to use phrases like 'stage gate'?

No
When…when I got invited to a business development meeting, it was quite early on when I was with them umm because my project was meant to look at new products they had this, sort of picture of a stage gate and I cant describe it in any other words, it was a picture of a stage gate with a sales funnel over the top…[The Associate then attempts to describe the process while drawing it]
So I questioned that model and said "OK great" because it was just a Powerpoint slide with all the products on and then they took it to the next slide which they only started to develop after I started which they called the QuadChart [The Associate then describes and draws this chart]
And I sort of said to them "OK, what work is done here" [pointing at the first checkpoint on the diagram "I dunno" [she adopts a mocking accent again]
"OK, what criteria do you review it against at the gateway, who reviews it?"
"We do"
"ok you write it and you review it?"
"yeah"
"so the three of you write AND review what products this company will develop?"
"yeah"
"OK, what work takes place here?" [pointing at the next checkpoint]
"they listed some items"
"OK, who reviews it here?"
"we do…sometimes we bring a senior manager in"
And this is where I said they needed to generate a clear Business Development Process.

So I said we'd start off by mapping the existing process that they use or have used.
So we started documenting this process and they said "we do this, we apply these questions in our head, we do this"

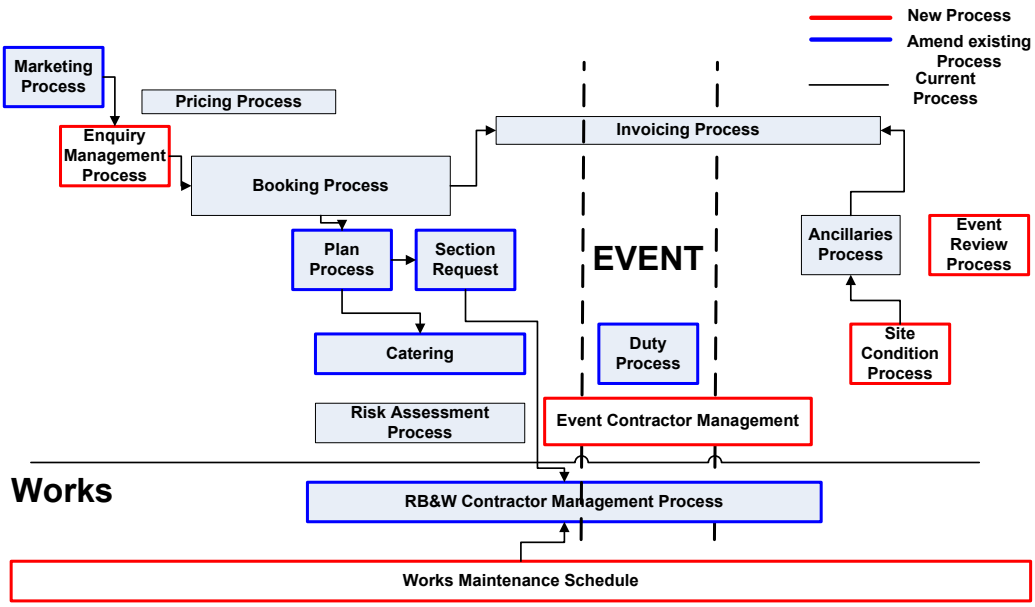
And I said “you cant to it in your head you need to have it documented” but that’s coming on to the new process so all I was trying to do was get an actual process documented.
And as it got towards then end, because it took three or four meetings to get to the last few stages, and in the end they were just sort of like “yes we do a stagegate there we do a gateway review, we do this that and the other” and it was just sort of like well you know that’s best practice and youre just sort of you don’t actually do it do you its just youre saying that. So they picked up that’s what they should be doing and told me that’s what theyre doing so I don’t think the existing process we documented…I think for the first half it was accurate and the second half I think it was inaccurate.

CHECK MY ANALYSIS – BUT THIS DOES SHOW THE IMPORTANCE OF ACTUALLY WALKING/VIEWING THE PROCESS AND NOT JUST GENERATING THE MAPS FROM MEMORY.

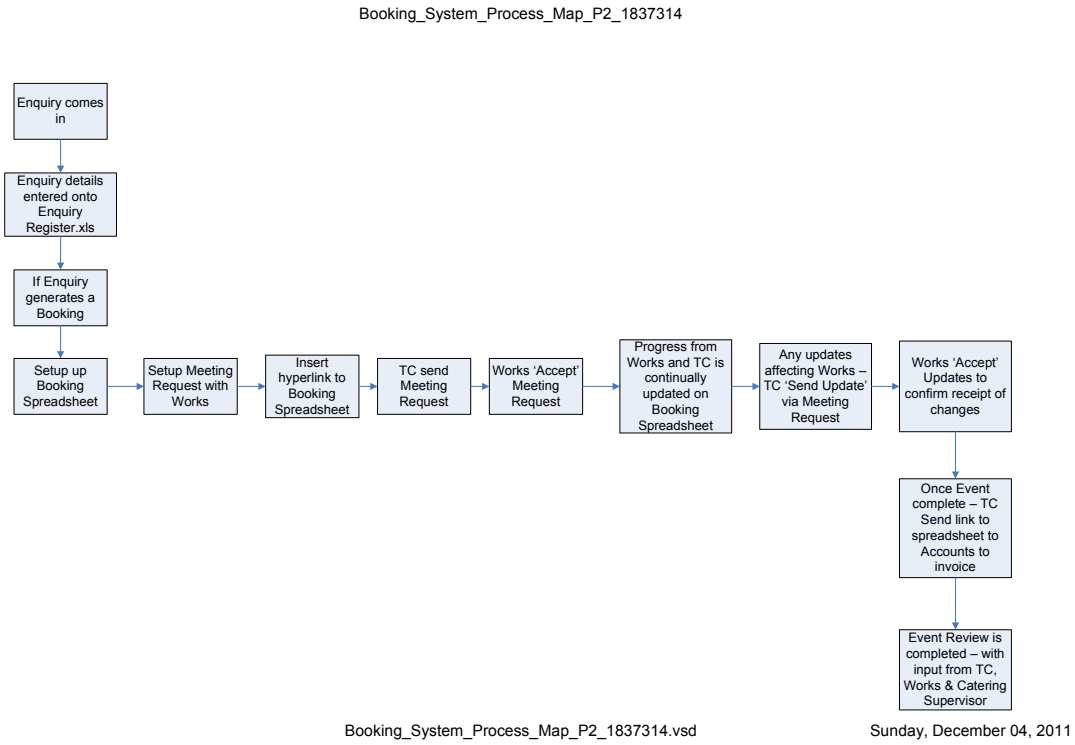
Im a bit confused because Ive been doing it for well over a year now sort of getting people’s ideas and the last thing I did was give them a umm right across the whiteboard in the conference room I mapped out or put up a stagegated process and said “all I want you to do nice and simple on post it notes write who should be involved, where, what work should be completed, what criteria you’d want to assess it against” and that’s for the group of people in every different department. So that’s the stage Ive got to.
So Ive got that and now Im gonna disseminate that into a process because Ive given up with them.

Appendix D

This process map was produced for the Rural KTP organisation and is a 'top-level' view of the responsibilities of the main organisation and the 'Works' department, before, during and after, an Event.
Indicated by the colour-coded key in the diagram, it shows the existing business process, the planned short-term improvement of the processes and their long-term development.

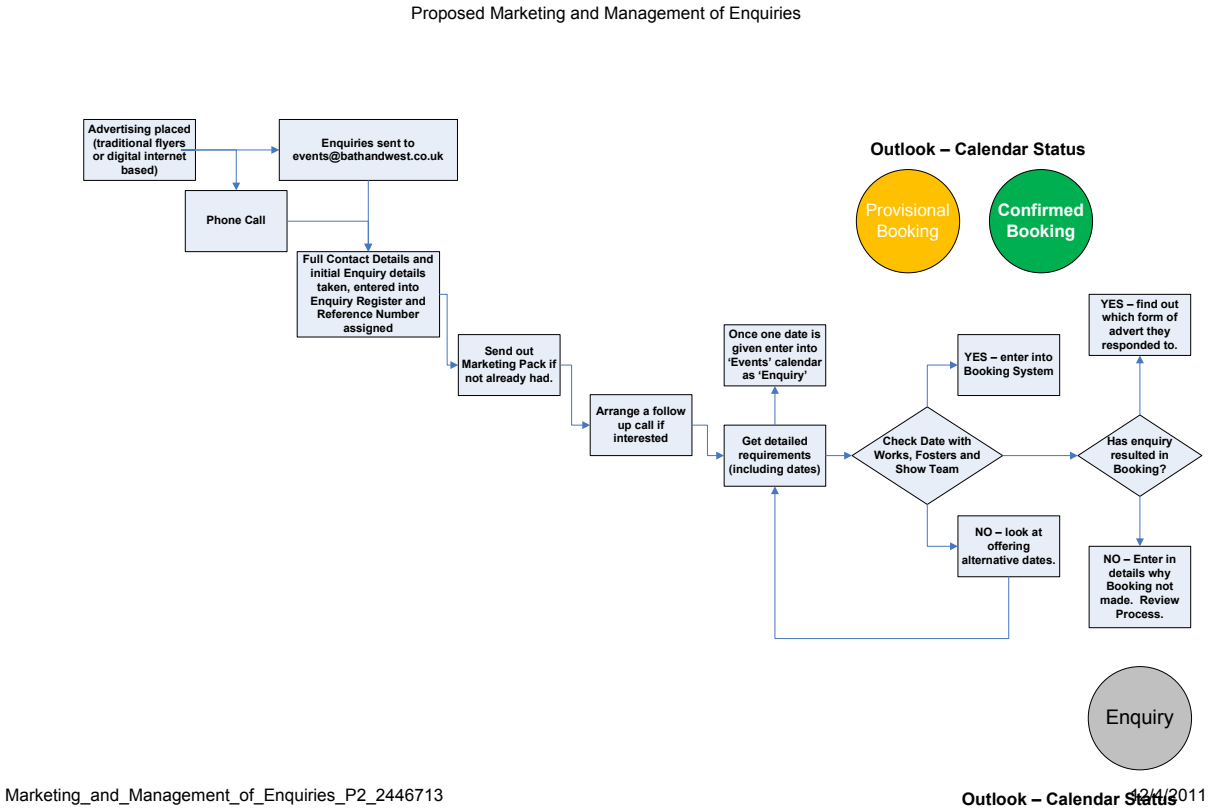


This process map was produced for the Rural KTP organisation and outlines the stages involved in making an online booking for an event.



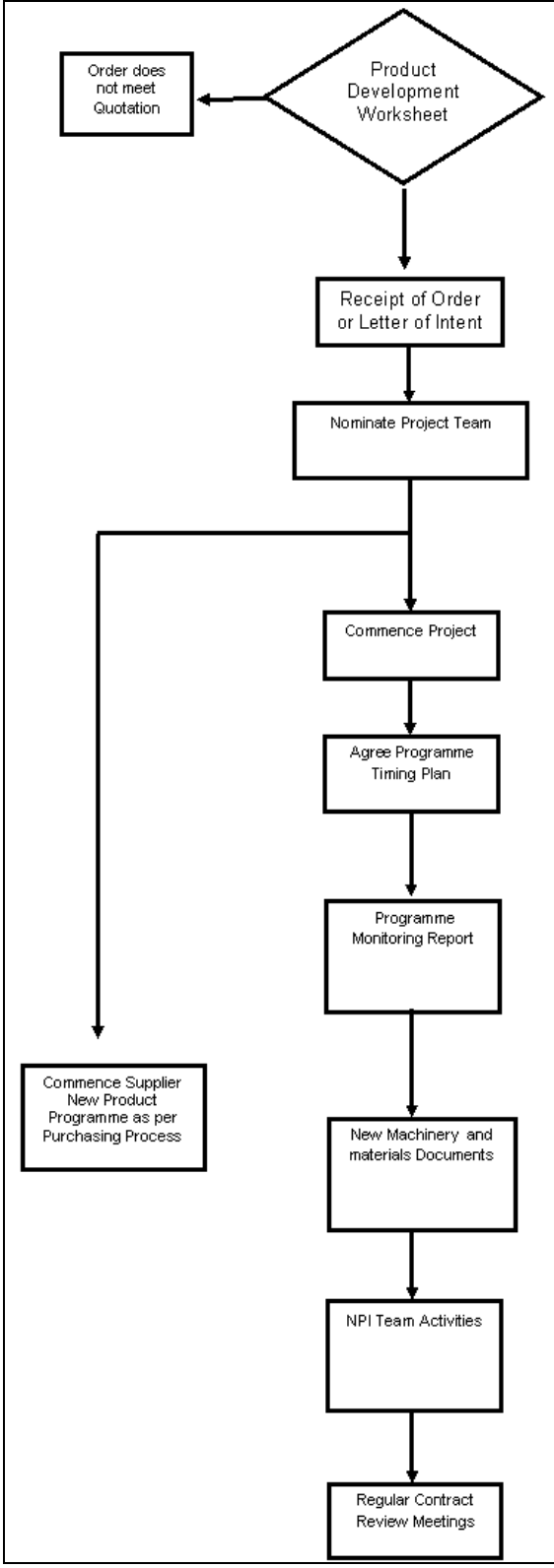
This process map was produced for the Rural KTP organisation and outlines the stages involved in marketing events and the subsequent receipt of enquiries.

The ‘Outlook Calendar Status’ graphic is used as a visual aid to train new employees, indicating how new enquiries are depicted within Outlook Express email client.



This process map was produced for the Military KTP organisation and has been further developed to become the New Product Development (NPD) operating procedure.

Process Flow



Procedure

1. Product Development

1.1 New Product Development Process to be followed prior to instigating NPI

2. Project Launch

2.1 The Commercial or Design Manager will launch a project within the company either on receipt of a customer order or letter of intent. To launch the project the Commercial or Design Manager will call a New Product Introduction Meeting and notify all departments.

2.2 The team will support all aspects of NPI, this team will be made up from:

i) Commercial
ii) Design
iii) Engineering
iv) Quality
v) Production

2.3 The team members nominated will be formally documented on the Programme Monitoring Report or customer documentation as appropriate.

2.4 The Commercial Manager will communicate the overall project timing and will distribute the information to the team. This will include, as appropriate:

i) Programme Need Dates
ii) Key Dates (Customer APQP Reviews/PPAP Dates)
iii) Commercial Spend Dates (Tooling, equipment etc.)
iv) Cost Targets & Budgets/Customer Contacts

2.5 The review will be supported by a Programme Monitoring Report or customer documentation as appropriate.

2.6 The NPI team activities will include:

i) Development/finalisation of special characteristics
ii) Development and review of FMEAs
iii) Establishment of actions to reduce the potential failure modes with high-risk priority numbers
iv) Development and review Control Plans
v) Review of Customer requirements (PPAP levels etc)

2.7 The Commercial Department will manage the project timing.

3. Supplier APQP Controls

3.1 The Contract Review Team will determine supplier controls at the start of the project where applicable.

4. Project Review

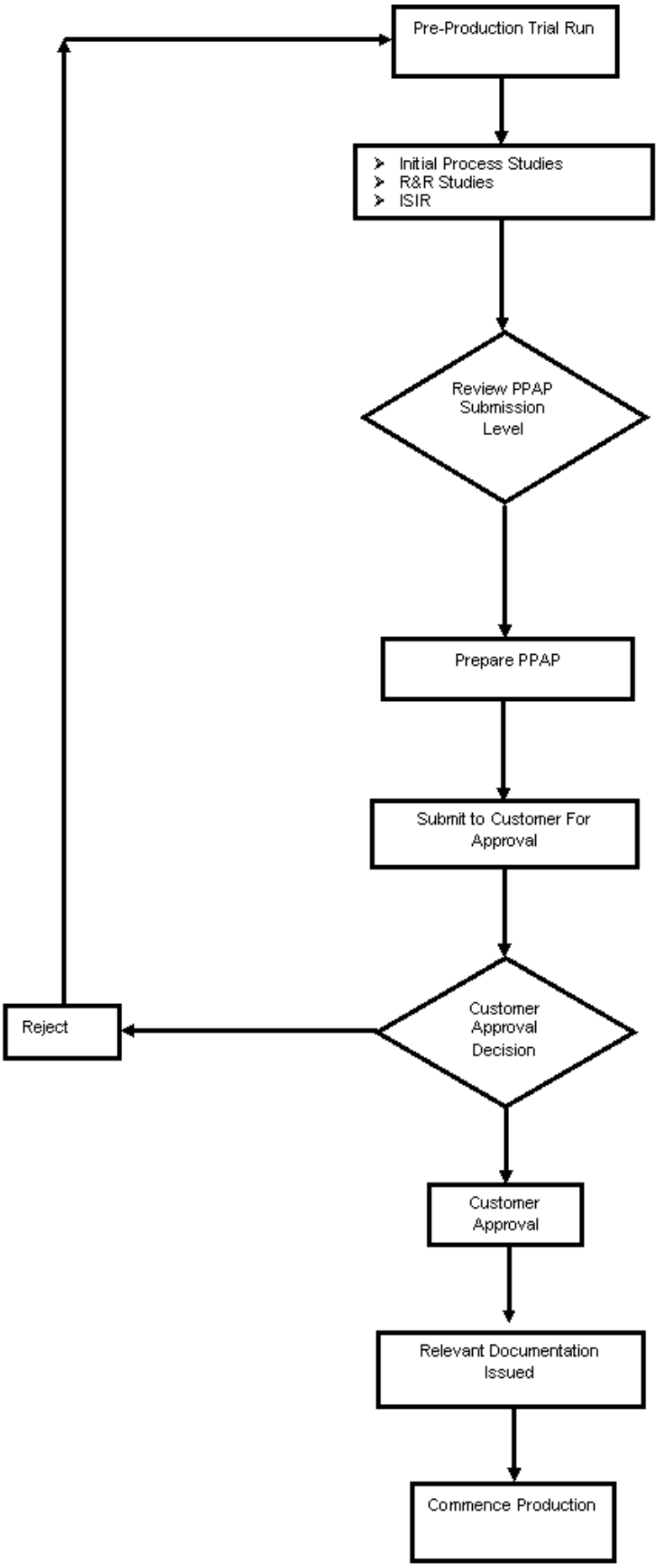
4.1 Project Reviews are conducted at regular intervals at the Contract Review Meeting and will always be conducted prior to:

i) Pre-Production Trial
ii) Production Approval

4.2 The Commercial Department will call a New Product Introduction Meeting which will review progress on the project status.

4.3 As defined above, the review will be supported by a Programme Monitoring Report or customer documentation as appropriate.

4.4 Any action agreed will be documented as defined above on a Programme Monitoring Report.



5. Production Part Approval Process

5.1 Product manufactured during the Pre-production run will be used where applicable to carry out any:

i) Initial Process Studies
ii) Capability Studies
iii) R&R Studies
iv) Layout Inspection (ISIR) & Testing

5.2 When the pre-production trials have been successfully completed, the Quality Assurance team will review the results and prepare a PPAP to meet customer requirements and will ensure that a Production Control Plan is prepared by Production Engineering.

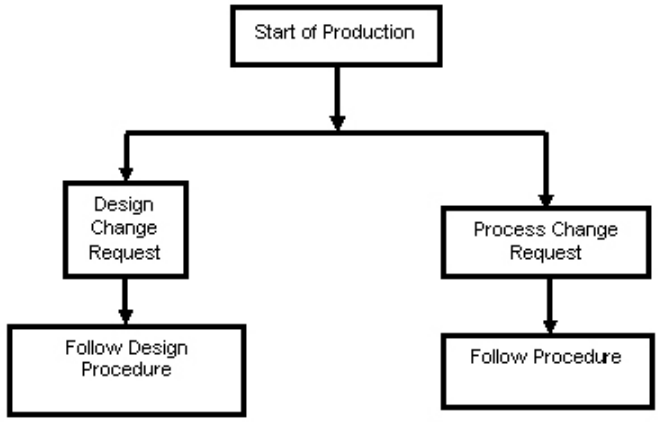
5.3 The submission levels for each customer will be determined with each customer. Each submission level will be documented on the Part Submission Warrant (or customer defined documentation) along with the reason for submission.

5.4 Submission of PPAP will always be required in the following instances:

i) New part or product (i.e., specific part, material or colour not previously supplied to the specific customer)

ii) Correction of a discrepancy on a previously submitted part

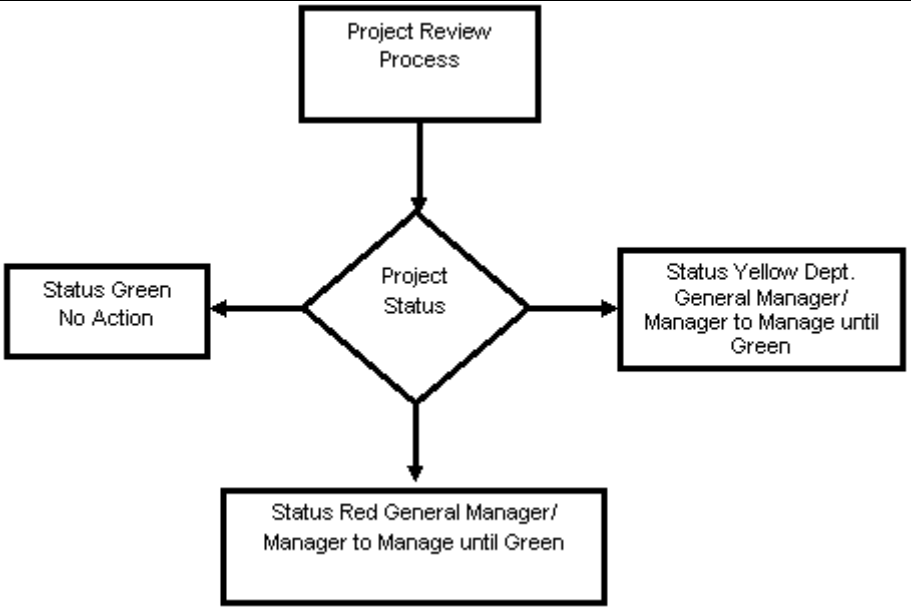
iii) Product modified by an engineering change to design records, specification or materials



6. Production Sign-Off

6.1 When the Customer has granted PPAP (Production Part Approval) and all concerns are resolved, the Part will be approved for manufacture and the relevant documentation will be issued to production.

6.2 Production can then commence.



7. Design and Process Changes

7.1 Design Changes

7.1.1 Will be controlled as outlined in Procedure.

7.2 Requesting a Process Change

7.2.1 Will be controlled as per Procedure

8. Project Review

8.1 The Commercial Department will review the status of each project on a weekly/monthly basis, minutes will be produced at each meeting and all actions required will be documented. Each month the General Manager/Business Development Manager will report project status in the form of a Monthly Report that will detail:

i) Programme Monitoring Report (By Project) using, Red/Yellow//Green Traffic Light System

ii) Any slippage's will be communicated and will detail:

1. Reason for slippage
2. Actions agreed
3. Responsibility for each action
4. Timescales for completion

Appendix E

Want to Increase your Research Potential and Grant Income?

Knowledge Transfer Partnerships [KTP] is a government funded scheme to enable businesses and organisations in the public and voluntary sector to access University skills and expertise to solve business problems and develop new opportunities.

A recently qualified graduate works for an organisation for a period of 1-3 years [supervised by company personnel and by you] on a specific project identified as critical to the future success and growth of the business. The project needs to show high levels of innovation, impact and challenge and one that transforms the business.

The benefits to you are:

- collaboration with innovative businesses
- development of business-relevant teaching materials
- Conference material and publish high quality research papers
- Getting out of the University and working on an innovative project for half a day a week
- Workload bundles!

Colleagues have worked on a number of KTP's including;

- _____ & _____ worked with Motivation - an International Charity which works to improve the quality of life for people with mobility issues. The project is developing a social enterprise to support the charities funding activities in order to reach more users.
- _____ worked with Bristol City Council & NHS Primary Care Trust to develop a road danger reduction approach for Bristol.
- _____ is working with Space Engineering - a local company to implement a comprehensive HR and development policy.

The university has a longstanding record of successful KTPs – see _____

Interested? Have you a company in mind that you would like to work with? Would you like to work on a KTP if a project came along in your area of expertise? Then contact _____ **on** _____ **or** _____ **on** _____